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KATHRYN BARNHART

BALLAD OF BODEGA HEAD KEEPING NUCLEAR POWER OFF THE NORTH COAST

Fifty years ago, a ragtag band of citizens teamed up to oppose PG&E's plans to build a nuclear power plant on Bodega Head, right on top of the San Andreas Fault. Their ultimately victorious battle preserved the rich marine habitat of Bodega Bay and the scenic beauty of the Sonoma Coast and, some say, helped shape the course of American environmentalism.

by Kenneth Brower

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SPECIAL SECTION



FEDERICA ARMSTRONG, FEDERICAARMSTRONG.COM

RANGE OF POSSIBILITIES RANCHING, RANGELANDS, AND CONSERVATION IN THE BAY AREA

Rangelands make up 40 percent of the land mass of the Bay Area and support much of the region's biodiversity. And most of those rangelands remain in private hands. That's why conservation organizations are partnering with ranchers to promote the shared goals of economic and ecological sustainability and to ensure continuing stewardship of these important working landscapes.

by Kelly Cash

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LEE AURICH, AURICH.COM/PHOTOS

WILDLIFE PARENTING 101 RAISING A FAMILY IN THE EAST BAY PARKS

Most of us head out to local parks to look for an interesting trail, a scenic picnic spot, or beautiful wildflowers. But for the animals that live in the parks, the perspective on the landscape is more procreational than recreational. We follow four resident species—bobcats, great horned owls, newts, and rain beetles—as they look for the best places to mate and raise a family in the East Bay parks.

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LETTER FROM THE PUBLISHER

Though Bay Nature Institute hasn't moved from its West Berkeley office since it opened in 2000, we're now in a new neighborhood. That's because the area has recently been rebranded as the "Gilman District." This once gritty industrial area in the northwest corner of Berkeley sports a brand new Whole Foods Market (complete with Allegro Coffee Roasters serving pour-over single-source coffee), across the street from the latest outpost of Philz Coffee (more pour-over), which is next door to the Kickstarter-funded Donut Dolly (open till 4:00 pm, but usually sold out by 3:00). The newest addition to this tasty lineup is Farmburger, a restaurant that features craft brews and burgers made of freshly ground, locally sourced, grass-fed beef, with posters educating diners about the ranches that supply it. There goes the neighborhood!

There's nothing too surprising about this scene in the Bay Area circa 2015. But in working on this issue's special section on rangelands and ranching, I found the contradiction hard to ignore: Just as demand for locally sourced beef is rising, the ability of local ranchers to produce it is going down. The soaring rents and real estate prices that make it difficult for young writers and families to live in the Mission (or Gilman) District also make it difficult for local ranchers— young and old—to keep ranching in west Marin or southern Santa Clara.

But hey, *Bay Nature* is a nature magazine; why should we care about this

trend (beyond hoping that our rent doesn't go up)? The answer has to do with a growing understanding of the role of rangelands as a significant component of Bay Area open space—40 percent of the land mass in the ten-county region. Think of the region's iconic oak woodlands and grasslands, from the treeless rolling hills of eastern Solano to the foggy coastal prairies of the San Mateo coast.

I used to look at these beautiful landscapes and rue the fact that so many of them were "locked up" behind fences and "overrun" with cattle. These places should be open to the public! And even on some public lands, like Briones Regional Park near Orinda, there are cows that leave huge divots and "cow pies" on the trails

and trample the aquatic vegetation by the ponds. Aren't they harming this ecosystem?

So I was surprised to learn from a study done on East Bay Regional Park District land that popula-

tions of endangered red-legged frogs and tiger salamanders do better when cows have access to the stock ponds. And I started to understand how cattle might actually be filling the ecological niche in grasslands once occupied by herds of elk, bison, and antelopes.

Could it be that cattle grazing might be a net positive for some habitats? This seems like heresy to someone who has written letters protesting the presence of cattle in erstwhile wilderness areas in the Sierra Nevada. I don't even like cows—I prefer my animals wild and undomesticated, though I'll admit to enjoying the occasional grass-fed burger. But I'm impressed by the science-based work done by conservation organizations in conjunction with local ranchers to figure out how rangelands

(continued on page 6)



DAVID POSLOSKY

Exploring, celebrating, and understanding the natural world of the San Francisco Bay Area

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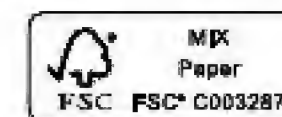
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FRONT COVER: An adult great horned owl with its two chicks. These owls like to nest in snags or on rocky ledges and are found in many parks throughout the Bay Area such as here in San Jose's Alum Rock Park. [Barry Grivett, San Jose, CA]

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NEWS FROM THE COMMUNITY AND THE NATURAL WORLD

COURTESY CALIFORNIA STATE PARKS FOUNDATION



State Parks Plan for the Future

Three years ago, California State Parks were at a low point. Years of chronic underfunding compounded by a state government budget crisis forced the parks department to propose the closure of 70 parks in order to keep the 209 other units open, while a funding scandal had torn a hole in public support for the department.

Fast-forward to today and it's arguably a more hopeful scene. While there's still a long way to go before the state parks are financially secure and culturally sound, there's a new blueprint to get there and renewed public interest in making change happen.

In February, the Parks Forward Commission, a team of independent advisers tasked by the governor and legislature to write a prescription for bringing the state parks system back to health, released its long-awaited report and recommendations. The 56-page report touches on many facets of park operations and governance, from cultivating leadership among promising park employees to modernizing the parks' accounting and budget systems and addressing climate change in park management plans.

Perhaps the most significant recommendation is for a kind of

cultural shift that would prioritize reaching out to California's increasingly young, urban, and ethnically diverse population. The commission proposes a 10-year goal of state park visitors mirroring the state's demographic makeup and suggests a "rigorous marketing strategy" to achieve it.

The focus on urban, young, and, in particular Latino visitors isn't just a matter of social justice or fulfilling the parks department's mission statement, says Parks Forward Commission chair Lance Conn. "If you're not continuing to make parks a relevant part of the lives of the people who are going to determine whether parks exist in the future, eventually the parks will lose favor," says Conn, a Bay Area businessman. "There's a political reality to this as well."

And though the report lists soccer fields in its lineup of "active recreation" activities that state parks might provide as part of this outreach, Conn says it's not as if the redwood parks are suddenly going to be overrun by sports leagues tearing up the forest understory. But there is a place for a greater suite of activities in the state parks system, he maintains. "I have absolute faith that these parks are going to be protected," Conn says. "I give tremendous credit to

people raising these concerns because they were here in the dark days when it wasn't assured, but you can protect the parks to death."

To lure new visitors, Conn says, park acquisitions could focus more on urban areas. According to the commission's field research, however, the one change that would have the most impact in the near term would be to install more affordably priced indoor overnight accommodations, such as rustic cabins or yurts, so that people who are not tent campers would have an opportunity to deepen their exposure to the parks. The report also suggests improving public transit to parks and increasing outdoor education programs.

A new nonprofit with the placeholder name Parks California, run by a board that reflects the state's demographic and geographic diversity, would be tasked with implementing the vision. Parks California would help raise the money and tie together the partnerships to bring new projects to fruition—and hopefully complement the work of existing nonprofit entities that have supported state parks.

"We certainly would welcome other players to the table if they are serving functions not being done by other nonprofits," says Elizabeth Goldstein, president of the California State Parks Foundation, a (continued on page 55)

(BAY VIEW continued from page 4) can be managed to both enhance biodiversity and produce healthy food. And if the ranchers aren't going to take care of this land, who will? Having them stay on the land as stewards seems preferable to having them sell out to developers of McMansions.

I'm sure that some readers will have concerns about our take on the role of ranching in open space stewardship. There is certainly a lot more to say about the topic and I invite your comments so we can continue the discussion online at baynature.org/rangelands. Whatever your perspective, I appreciate your being part of the community that cares passionately about the Bay Area's extensive and diverse open space. 🐾

EAGLE!

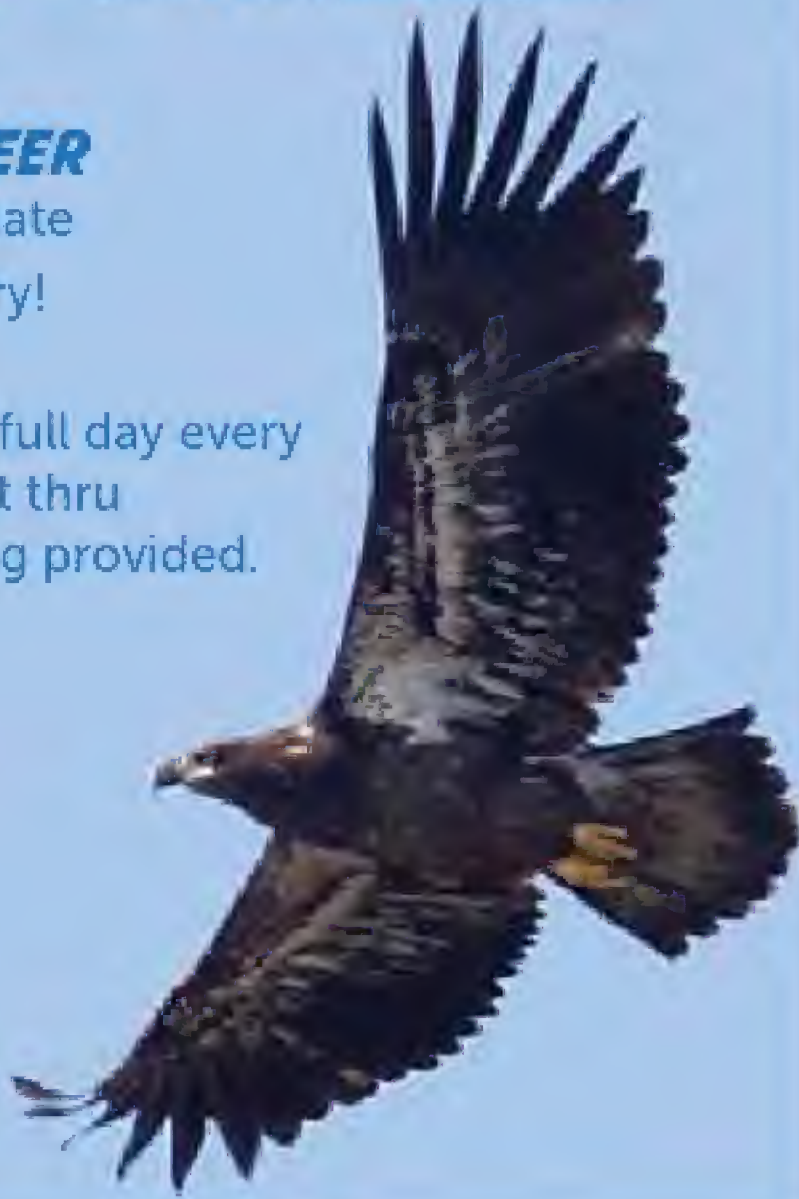
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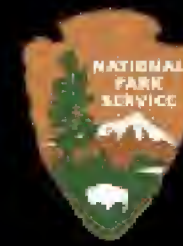
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A male bluebird watches as a female checks out his nest box at Ed Levin County Park in Milpitas.

Solano Land Trust project manager Sue Wickham. "But they get put up without being maintained."

Regular maintenance and monitoring are important to protect the eggs and chicks and to increase fledgling counts. Monitors can identify problems and address them. They also take careful notes and share their findings with other groups, which increases the general body of knowledge about cavity nesters.

To establish a monitoring program at Lynch Canyon, Wickham turned to Swenerton, a retired high school science teacher and volunteer docent at several Solano Land Trust properties.

Swenerton knew birds but didn't know much about starting a bluebird program, so he contacted Bob Brittain in Contra Costa County for guidance. Brittain, a retired chemist, has been stewarding bluebird trails in Walnut Creek for a decade, and he now coordinates an informal group of 12 volunteers who steward and monitor about 10 bluebird trails in Walnut Creek, such as those at Acalanes Ridge Open Space, Old Borges Ranch, and Shell Ridge. In 2014, his bluebird team counted 164 fledged bluebirds on these trails.

When Swenerton asked Brittain to attend a training session for Solano Land Trust volunteers, Brittain was happy to jump the county line and share what he has learned, including how to build a bluebird box from one five-foot length of redwood plank. Brittain has learned to provide partial shade for the boxes and to place them in a transition zone between woods and meadow so that chicks can practice flying and hunting on nearby vegetation. He says his current preferred box design has a slanted roof for rain runoff, as well as side and top panels that hinge open. All panels must be closed securely with dry-wall screws when not being tended by monitors, to keep out snakes, raccoons, and other predators.

A trail monitor's tool kit contains more than just a Phillips-head screwdriver. The monitors also carry drywall screws, a flyswatter, a paint scraper to

Helping Hands for Bluebirds

People come out of the woodwork to protect bluebirds," says Earl Swenerton, the volunteer captain of a new bluebird-monitoring program at Lynch Canyon in Solano County. During last year's nesting season from mid-March to mid-July, 16 volunteers were selected and trained to monitor 40 nesting boxes at Lynch Canyon Open Space, a 1,039-acre property between Vallejo and Fairfield owned by the Solano Land Trust. The final tally for the season of fledged cavity-nesting birds was 23 western bluebirds, 20 tree swallows, and six house wrens. Not bad for a monitoring group considered newly fledged itself compared to several decades-old programs in other parts of the Bay Area.

With the sun's azimuth still low in the sky, and three months before birds carried their first twigs to nesting boxes,

Swenerton and I walked Bluebird Trails #1 and #3 on Lynch Road along the North Fork of Lynch Creek. A bluebird trail is a series of nesting boxes that are monitored for fledgling success (or lack thereof) of western bluebirds and other cavity nesters such as ash-throated flycatchers, violet-green swallows, and house wrens. Though other cavity-nesting birds are welcome, the bluebirds are the star tenants. Male bluebirds are especially showy and provide a brilliant flash of color in the field. Females are less brightly colored and show their patches of blue in quick flashes.

Many of the 40 nest boxes at Lynch Canyon were installed years ago by Cub Scouts and members of the Napa-Solano Audubon Society, but they have not seen regular monitoring or maintenance until now. "Bluebird boxes are a fun and doable project for Scouts," says

clean out the box, diatomaceous earth to be used as an insecticide, and lye soap to deter wasps from building nests. Volunteers may also carry a measuring tape and a smartphone to determine GPS coordinates and the direction the box faces. After just one year the Solano Land Trust crew has learned that the boxes with the most fledgling success face east or south away from prevailing winds; have round entry holes measuring one and nine-sixteenths of an inch; and measure six inches from the bottom of the hole to the floor of the box. If the box is too shallow predators can reach the chicks. If it's too deep the chicks can't crawl out. To make the house just right, the box builders carve little grooves on the inside for the chicks to stepladder their way out.

Not all nesting boxes are alike. The Lynch Canyon boxes are mounted on posts, while Santa Clara Valley Audubon Society's Cavity Nesters Recovery Program advocates hanging nest boxes from trees. According to Santa Clara Valley Audubon coordinator Toby Goldberg, this "robust" program has

about 50 volunteers to monitor its boxes. It began in 1997 with 230 boxes on 17 trails and has grown to support 1,300 boxes on at least 100 trails. As of September 2014, volunteers reported 1,134 fledged western bluebirds—about six times the number of boxes, and nearly 13 times as many birds since they began.

Each region continues to learn and adapt its methods to changing conditions. For example, Brittain notes that he and his team have seen more predation and loss of birds since the drought began. Everyone involved will be looking for ways to help the birds fledge as the drought continues.

For the 2015 spring season Swenerton is recruiting and training more volunteers, adding new boxes, and expanding the program to Rush Ranch Open Space. "I didn't expect such an emotional involvement from the volunteers," Swenerton says. During the nesting season, the monitors kept watch as the bluebirds built nests, laid and incubated the tiny blue eggs, and fledged their young. "The volunteers developed a

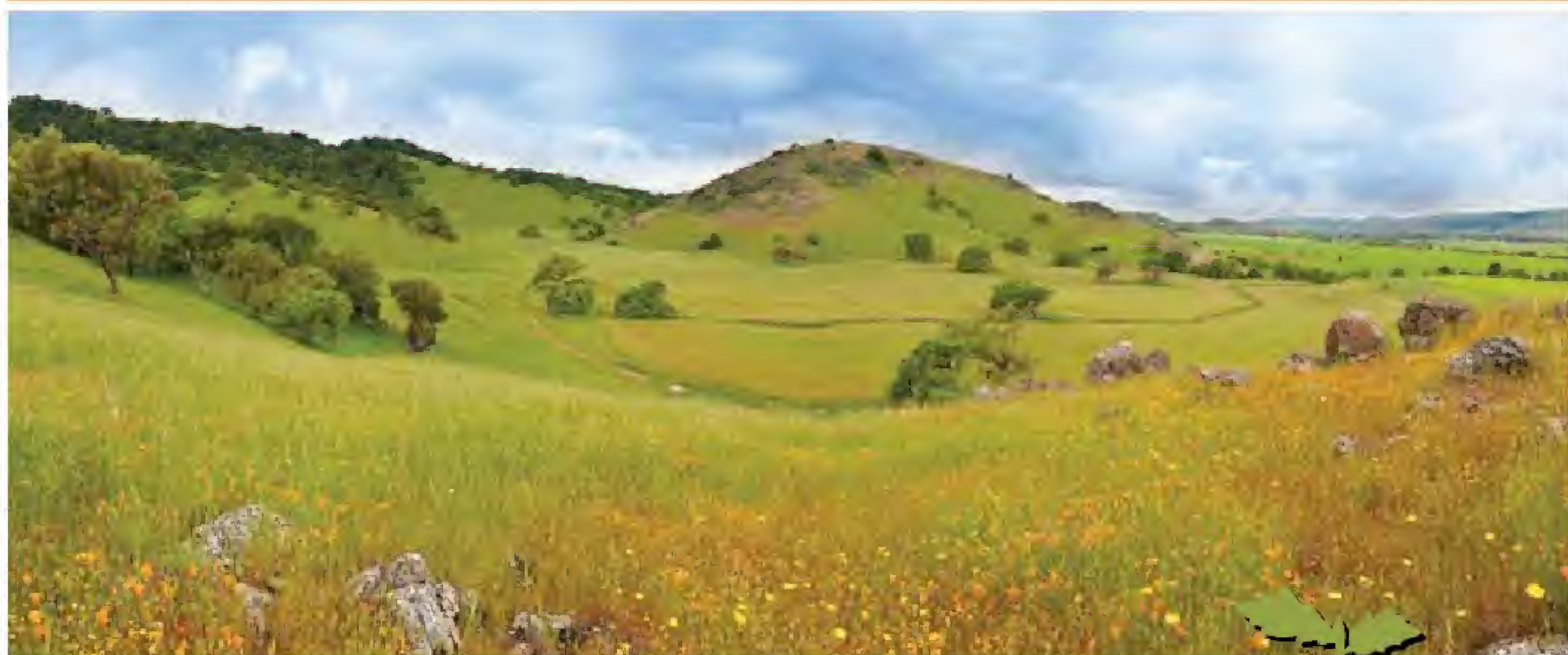


ALTA GEORGE

Earl Swenerton, leader of a volunteer bluebird monitoring program in Solano County, inspects a bluebird box at Lynch Canyon.

personal attachment to the birds and to their trails," says Swenerton, who saw 100-percent return participation from his teams. He hopes to see that, and more, from the bluebirds, this spring and in years to come. 🐦

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signs of the season

Calochortus Lilies Catch the Eye

The California Consortium of Herbaria houses exactly three dusty *Calochortus* specimens collected in 1833 by the British naturalist David Douglas (you know him from Douglas fir and Douglas iris). These collection sheets represent some of the oldest herbarium specimens of California flora, from a frontier location Douglas called Nova California. He didn't record a particularly accurate location for it, but we know now

that *Calochortus pulchellus*, the Mount Diablo fairy lantern, grows only in a narrow range in the East Bay and Solano County, placing Douglas—and his collection—somewhere in the shadow of Mount Diablo. But it would be several decades before the plant even received a formal name. Douglas just saw it, appreciated it, and picked it to chronicle New World wonders.

Even from that 180-year-old specimen you can see why this plant would catch the eye of a roving naturalist. *Calochortus* is a genus of flowering monocots endowed with large, showy, brightly colored and attractively marked petals and perfect symmetry of color and form. Although these flowers are rarely taller than a foot, they do not fail to attract attention.

Douglas was certainly not the first to set eyes on the beautiful and elegant *Calochortus* lilies, since native Californians such as the Pomo collected the bulbs from well-recorded and tended sites and cooked them in earth ovens. However, the miniature onion-like bulbs were likely not a favorite food given their small size, their slow growth (it can take five years from seed to flower), and the



VERNON SMITH

The eye-catching markings of the clay mariposa lily (*Calochortus argillosus*) attract the attention of both humans and insects.

effort required to excavate them.

Calochortus belongs to the family Liliaceae, commonly known as the lily family, although some researchers yearn to elevate this genus into its own family: Calochortaceae. The name *Calochortus* is derived from the Greek for “beautiful grass,” which pays homage to its vegetation, best described as long, arching, grass-like leaves that can be spotted even before the late spring-blooming flower is present or in those

years when the flower itself does not make an appearance.

But it's the floral display that catches everyone's eyes: from the pendant snowy drops of the white fairy lantern (*Calochortus albus*) to the purplish hirsute petals of Tolmie's pussy ears (*Calochortus tolmiei*) to the open golden landing pad adorned with rich burgundy splashes of the yellow mariposa lily (*Calochortus luteus*), the flowers of this genus regularly inspire awe and cause digital camera cards to fill up quickly. Arguably the most diverse bulb genus in the Western Hemisphere,

Calochortus contains many California species that are narrow endemics, growing only in limited areas, and are therefore protected as state or federal rare species.

This high degree of endemism and diversity, some researchers have argued, could be a consequence of the genus' large seeds, which do not disperse well. Thus, many species became highly adapted to the particular substrates and climatic conditions of the place they evolved. The endangered Tiburon mariposa lily (*Calochortus tiburonensis*) on Ring Mountain in southern Marin is one example of narrow endemism.

There are 18 species of *Calochortus* identified in the Bay Area, although hybrids may be found that can stump the best of the taxonomists. The genus can be split into four groups that are all easily discernible: mariposas with open, tulip-like upright floral displays; cat's ears with smaller displays covered by trichomes (which look like thick hairs); star tulips with spreading, smooth petals; and fairy lanterns with drooping, closed inflorescences.

One of the easiest species to locate is the white fairy lantern, which lights up at sunset with the slightest pinkish

and golden hues. Well represented in woodlands and scrub habitats, this plant often sits at the edge of vegetation communities, benefiting from both sun and shade. White fairy lanterns are found in all counties south of the Golden Gate and in the Sierra Nevada. The Sneath Lane trail through San Mateo County's Sweeney Ridge (GGNRA) is one of hundreds of places graced by this plant in the Bay Area.

Pussy ears are another notable beauty, ranging from Canada to the southernmost occurrences in Santa Clara and San Mateo counties, mostly along the coast. This furry cat's ear lily was once spotted by the godfather of California botany, Willis Linn Jepson, in Gilroy's Little Arthur Creek, although it likely hasn't been seen there in more than 100 years. Instead, try the grassy slopes at Point Reyes National Seashore, like those just west of Abbotts Lagoon or atop the bluffs at Chimney Rock.

Of course, the beauty of the floral display isn't just for human enjoyment. *Calochortus* attracts a wide variety of

insects to its nectar and other parts of the plant. One paper from the journal *Oikos* in 2000 notes that insect visitors to *Calochortus* species were observed feeding on pollen, at the glands, on the long hairs, and at the ovary base, while others even used the plant for mating. In fact, it's not unusual to see two or three species of insect on the same flower, benefiting from its supermarket of resources.

The bugs are a tiny reminder of the splendor of *Calochortus*, a plant that emerges in the spring as a grass, explodes into a captivating flower, and just as quickly fades away with little trace. These lilies have fed and inspired generations of people and insects alike. See how many you can find this spring. And don't forget to bring your camera! 📷



CINDA MACKINNON

The Mount Diablo fairy lantern, *Calochortus pulchellus*, grows only in a narrow range in the East Bay and Solano County.

CALOCHORTUS LILIES OF MOUNT DIABLO

Saturday, May 2, 9:30 a.m.-1 p.m.

Join Bay Nature and botanist Lech Naumovich to search for beautiful *Calochortus* lilies in Mount Diablo's Rock City area. Space is limited. Sign up at baynature.org/field.

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NEW PRESERVE IN COYOTE VALLEY CURBS TECH SPRAWL

HOW GREEN IS MY VALLEY!

by Lisa M. Krieger

WE'RE STANDING IN a sanctuary that nearly didn't happen. A paradise almost lost.

This lush green meadow in the Coyote Valley, which runs north-south along Coyote Creek from San Jose down to Morgan Hill, has been targeted for residential and commercial development several times since the 1970s.

But the tech industry's ups and downs have been this landscape's salvation, as a series of economic downturns delayed development and created opportunities for the conservation community to buy and protect this precious property.

So our hike today is not on asphalt but instead along a new trail up to splendid views in the brand-new Coyote Valley Open Space Preserve, a 348-acre rolling expanse of hills, oak trees, and serpentine outcroppings—all just a short bus ride away from a city of one million that's a national symbol of suburban sprawl.

"Perfect timing. This could have been tract homes," says Derek Neumann, a field operations manager at the Santa Clara Valley Open Space Authority, which purchased the property five years ago. "It was going to be one-to two-acre home sites."

The former ranchland of Coyote Valley Open Space Preserve narrows into the eastern foothills of the Santa Cruz Mountains.

In summer 2015 the park's two loop trails will be completed and the former ranch will open its gates to the public. One trail, three miles long, ascends a ridge to picnic tables and sweeping views of the South Bay. The second is a mile-long perimeter trail around the 26-acre meadow—perfect for anyone looking for a short, scenic, relatively flat walk.

It's no surprise that much of the Bay Area's public open space is found in the hills, where development pressures aren't as strong as in the valleys. That makes the new Coyote Valley preserve all the more valuable. "This is one of the few places where the public has access to the actual valley floor, not just the hillsides. That was critical to us," Neumann says.

The preserve also protects one corner of Coyote Valley's critical habitat here at

SALLY RAE KIMMEL

the southern narrowing of the broad Santa Clara Valley. And it represents another step toward a trail connecting 10 county and regional parks in the heavily populated South Bay—from Lexington Reservoir near Los Gatos to this Coyote Valley parcel, spanning a distance of 15 miles.

In springtime the landscape seems almost ebullient. The sun strengthens, the air warms, and great billowy clouds sail over the valley like a caravan of tall ships. Insects fill the air and wildflowers appear in these pastures, still grazed by a small herd of Black Angus. “This whole area turns into a carpet of yellows and golds and oranges and whites,” says Matt Freeman, assistant general manager of the Open Space Authority. Peak bloom usually comes in mid- or late April.

WE’RE FLANKED BY two outcroppings of serpentinite, a metamorphic rock that produces soils with high concentrations of iron, magnesium, and other minerals that are toxic to many plants. But a number of native California plants have adapted to this nutrient-poor soil, including the only two plants eaten by the larvae of the threatened bay checkerspot butterfly—California plantain and owl’s clover—which have found a home in the preserve. The checkerspots’ greatest stronghold is just across the valley on Coyote Ridge, and while the rare butterflies are still unusual in the acreage of the new preserve, protection and restoration of these outcroppings could provide additional habitat, and help expand their range, says Stuart Weiss, chief scientist at the Creekside Center for Earth

Yellow-billed magpies, at the western extent of their range, can be seen at Coyote Valley Open Space Preserve.

Observation and a leading expert on the checkerspot.

Other unique wildflowers of these serpentine rocks include the rare Santa Clara Valley dudleya. “It is a hotbed of diversity,” Weiss says. “A remnant valley oak savannah, with beautiful blue oak woodlands and then serpentine grasslands on rocky outcrops.”

From a nearby field, a harrier keeps a watchful eye. A pair of magpies, pretty much at the western extent of their range, exchange a harsh, chattering “wock-a-wock, weer, weer” as they fly between valley oaks. In the distance to the east, commuters race by on Highway 101.

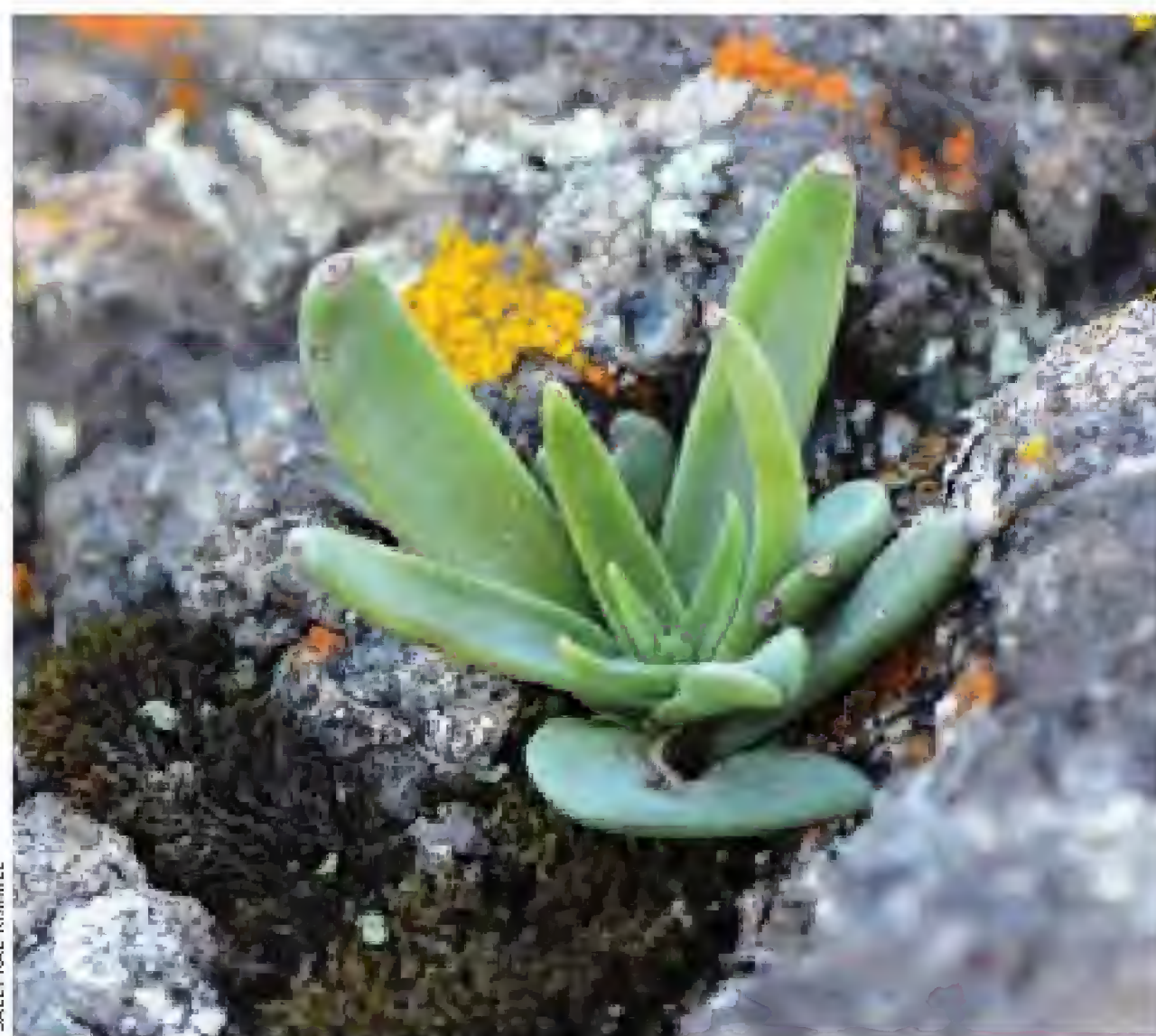
The commuters are a big part of the story here in the fastest-growing county in the Bay Area, with a population projected to increase by 36 percent—another 700,000 residents—by 2040. In 2001, the Coyote Valley was named a Last Chance Landscape, one of the 10 most endangered landscapes in the nation, by Scenic America, a nonprofit group in Washington, D.C., whose goal is to preserve the scenic character of communities.

FOR NEUMANN, the place is a reminder of the agricultural center the big valley once was. He’s watched as the fields and orchards of his childhood were transformed into endless suburbs, factories, parking lots, shopping centers,

freeways, and cloverleaf exchanges—and he marvels at the rapid rate of change.

“I grew up in San Jose back in the day, when Highway 101 was only two lanes, in either direction,” he recalls. “There were orchards in the valley. We’d pick crops when farmers wanted help, and sometimes when they didn’t,” he laughs. “Those were the days.”

To get a view of some of what’s been lost—and saved—we climb out



SALLY RAE KIMMEL

Endangered Santa Clara Valley dudleya grows in fissures in the serpentine outcrops of Coyote Valley Open Space Preserve.

of the meadow toward the park’s best view: a rocky perch on the southern ridgeline, overlooking the trough of the wide Santa Clara and narrower Coyote valleys.

The trail takes us under a canopy of blue oaks, which thrive in these lean and dry soils. We smell fragrant California bay laurels and step over California buckeye seeds, looking polished and lacquered. We startle a pair of deer, who bolt into the woods.

It was on a trail like this that Neumann first fell in love with the outdoors. He was in eighth grade, just another suburban kid from San Jose, on a school field trip. “I still remember that, to this day, 30 years later,” he says. “If I can do that same thing for one person, I have really succeeded. If I can do that for a whole host of people? Wow. What a legacy to leave.”



SALLY RAE KIMMEL

NOW HE OVERSEES construction of trails—"an art and a science," he says—on several Open Space Authority properties. His team studies maps to learn the contours, elevations, and presence of any fragile species. They chart six or seven potential routes, taking care to keep the grade at an average of five to six degrees, never exceeding 12 percent. Each route is assessed for landslide risk and tagged with flags. To prevent erosion, Neumann has learned to build small retaining walls rather than carve into the hillside and gently "outslopes" the path, so water won't puddle. "A lot of trail-building is about 'feel,'" he says. "I ask myself, 'Does this feel right? Does it have enough swooping curves to it?'"

Checking out Neumann's handiwork, we climb out of the woods and emerge onto a vantage point on a windswept knoll, along the edge of a razorback ridge overlooking the South Bay. Immediately below is a view of the entire 7,400-acre Coyote Valley. Beyond,

Workers with the California Conservation Corps preparing a new trail in advance of the opening of the preserve.

to the east, is the 4,000-foot massif of Mount Hamilton, crowned by the University of California's Lick Observatory. To our west, we see the white ball of the National Weather Service's Doppler radar, on the shoulder of Mount Umunhum. Oak-studded hills roll off along to the southern horizon, beyond Gilroy.

Standing here, we can see the landscape through geologic time. We look down on what geologists call the Santa Clara Basin, a broad, flat alluvial plain which for the past 1.5 million years has been accumulating water and sediment



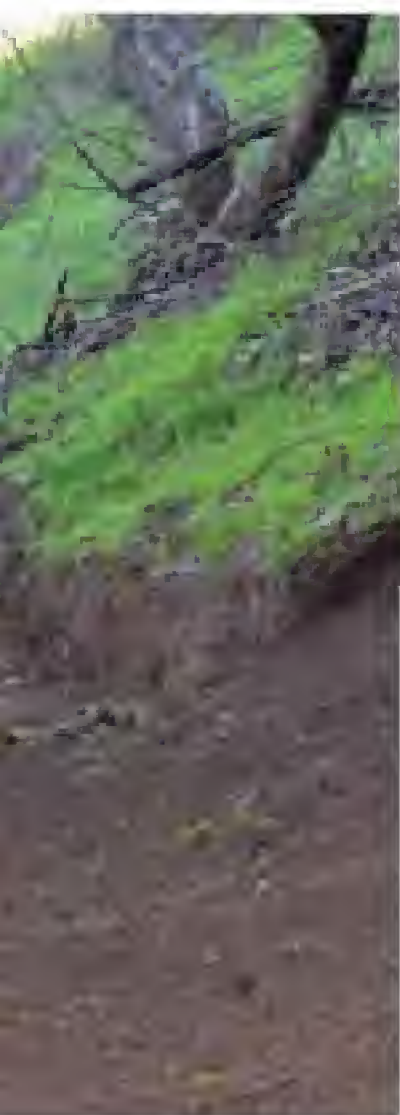
SALLY RAE KIMMEL

from the Santa Cruz Mountains to the west and the Diablo Range to the east. It is bounded by restless faults: the San Andreas Fault on the southwest and the Hayward and Calaveras faults on the northeast. Coyote Creek has its origins above this basin, in a smaller eroded valley created by the incessant grinding of rocks along the Calaveras fault.

We visualize the ancestral winter storms that washed rich soils from these hills, rinsing them into the valley's Fisher and Coyote creeks corridor. The meadow below us was likely once a wetland, home to reeds and willows, and is still a site of frequent flooding. (The Laguna Seca, a seasonal wetland a half-mile beyond the gates of the new preserve, still draws hundreds of birds, including long-billed curlews, ferruginous hawks, the occasional bald eagle, and flocks of tricolored blackbirds, the latter a once-common visitor whose population has plummeted in recent years.) For millennia, wildlife has used this valley to travel both north-south and, more important, east-west between the large wildlife reservoirs of the Santa Cruz and Diablo Range mountains. So as the concrete of the Santa Clara Valley has filled in around it, the new preserve remains the edge of a critical modern wildlife corridor, where mountain lions, bobcats, deer, coyotes, and badgers can gather to head east across the valley and up into the Diablo Range, or complete their crossing of the valley and disperse again to the west.



BEN PASE, PASEPRESS.COM



NOT ALL OF THE human footprint here is concrete, though. From our perch 700 feet above the valley floor, we admire the geometry of what remains of the valley's agricultural heritage: pastures, row crops, greenhouses, barns, and an old picket fence line. This landscape, once dubbed the Valley of Heart's Delight, was among the most productive farming areas in

the nation, producing plums, apricots, cherries, walnuts, garlic, hay, and more.

We gaze north at distant subdivisions and the big white rectangles of Metcalf Energy Center, producing power for San Jose and the tech industry that began after World War II, triggering the hous-

The view northwest to the spine of the Santa Cruz Mountains shows the new preserve's value as a link in a chain of protected open space between the Santa Cruz and Diablo mountain ranges.

ing boom that continues to this day. The valley air is stained by brown haze—toxic gases and particulate matter emitted by vehicles. But directly above us, where the air is clear, a golden eagle and two turkey vultures wheel on thermals.

As the tech industry burgeoned and Silicon Valley expanded southward, the peaceful Coyote Valley became the South Bay's last undeveloped frontier. Tandem Computers eyed it as a site for expansion. Then Apple Computer made plans. More recently, Cisco Systems had visions of a sprawling new campus. Land developers, high-tech businesses, construction firms, and politicians hatched plans for a mini-city of 75,000 people—bigger than San Rafael, Walnut Creek, or Mountain View. This small parcel where we're standing now, ranches by the Tilton family since 1917, was part of that urban high-tech dream. "My grandmother sold it to developers in 1993 so she could cover inheritance taxes," says Janet Burback, who now runs her family's 2,700-acre Tilton Ranch, adjacent to the preserve. "Before then we had the land in oat hay and cattle."

But before the property could be developed Silicon Valley's bubble burst—not just once, but twice. Home values plunged. The troubled economy, uncertain housing market, and costly planning delays created too much downside for the developers. Taking advantage of the developers' misfortunes to save a piece of the valley floor, the Open Space Authority negotiated a \$3.48 million deal for these 348 acres—a bargain for property that could have commanded up to \$1 million an acre if sold for residential housing. "The economic pressure came off," Neumann says. "The property owners decided to sell to us, rather than holding and waiting for development potential."

Now the property has a new mission: hiking, outdoor education, a wildlife corridor, and agricultural rights, which are leased to Tilton Ranch for grazing. "I like the fact that it's not developed," says Burback, who will run 30 Black Angus cattle on the land once owned by her grandmother. "If they keep their promise and maintain it with grazing leases they'll be able to acquire





A golden eagle soars over Coyote Valley Open Space Preserve.

GETTING THERE:

Coyote Valley Open Space Preserve is expected to open in summer 2015. From most of the Bay Area, take Highway 101 south past central San Jose. Exit Bailey Ave; turn right on Bailey, left on Santa Teresa Blvd, and left on Palm Ave. A new paved parking lot, with turnaround for horse trailers, has been built at the end of Palm Ave. New bathroom facilities are being constructed on site. For details on trail conditions and the opening date, check with the Santa Clara County Open Space Authority: openspace-authority.org/.



Lisa M. Krieger covers science, medicine, and water issues for the San Jose Mercury News.

more land, because ranchers will want to work with them."

We reach the end of our trail, marked by a pile of rocks and rubble. It's a reminder of how much is yet to be done. Soon a helicopter will land on this site, delivering 10,000 pounds of materials for the construction of five bridges. When complete, the trail will continue over swales and along a steep upper western ridge, then descend, in a series of graceful switchbacks, through woodlands before joining an old ranch road.

It will end where we began, in ankle-deep grass under the graceful canopies of valley oaks. Soon this will be the site of an outdoor education pavilion, with interpretive signs. In the next decade, it is hoped, the trail will go much farther, linking to other public parks so people—and animals—can take long excursions up mountains, across scenic ridgelines, and into redwood forests.

THE DAY WILL COME, Neumann predicts, when Silicon Valley's development pressures will bear down on this stretch of Coyote Valley once again. Even now, standing in this serene meadow, we hear its distant menacing hum.

But this valley will not suffer that valley's fate. Through luck, timing, and

hard work, the Open Space Authority has found a way to keep one valley from destroying another. "The bulldozers stop here," Neumann says.

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1 DELTA



LEE GREENGRASS

Cosumnes River Preserve

If you had a kayak, and enough time, you could put in at San Francisco Bay and paddle east through the Sacramento River Delta to where the Cosumnes River meets the Mokelumne in a little-known constellation of sloughs, marshes, and forests south of Sacramento.

Failing that, you can still experience the wild natural environment of the Delta at the Cosumnes River Preserve. Once the sandhill cranes have flown north in March human visitors are few, and you can walk alone for hours on more than 10 miles of inviting trails, boardwalks, and bridges, out into oak-studded grasslands and freshwater tule marshes or on levees overgrown with a tangled riparian forest of cottonwood, willow, and wild grape. Beavers, river otters, and muskrats swim here, and you might also spot a rare giant garter snake. Tens of thousands of bats roost under a bridge designed to accommodate them. Some fall prey to raptors, including threatened Swainson's hawks, who wait for the bats to swarm out at dusk. Volunteer-powered habitat-restoration projects are on view, including reconstructed marshes and nest boxes for wood ducks. This may be only a shadow of California's ancient delta, but it's a very special part of the natural world.

Oh, and if you do have a kayak, you can launch it here and really get into the reedy backwaters . . . or even paddle to the Bay!

GETTING THERE: From Thornton near Hwy 5, take Thornton Road north to Franklin Blvd. (about 5 miles). Entrance is on the right. No dogs or bikes allowed on trails. Toilets and visitor center on site. [Ann Sieck]

2 SAN FRANCISCO



RUTH GRAYNIS

Glen Canyon Park

It's not surprising that 56-acre Glen Canyon Park, nestled in a narrow canyon between San Francisco's Diamond Heights and Glen Park neighborhoods, is popular with locals, providing as it does an intimate respite from concrete and urban bustle. A long-running trail restoration project now nearing completion has fixed eroded trails and removed invasive plants, and there are plans to add way-finding signs and ADA-accessible paths.

Beyond the playground and tennis courts at the park's south end, wide trails pass through stands of blue gum eucalyptus and pine, nesting spots for red-tailed hawks and great horned owls. At the north end, a series of paths and small footbridges (many newly renovated) affords easy walking through the dense thicket of willow trees that thrive on the banks of slow-running Islais Creek.

Joggers, dog walkers, and kids seem to prefer the more open dirt paths that cut along the canyon's steep eastern rim. Craggy outcroppings and boulders of rusty-red radiolarian chert, encrusted with lichen, are perfect for clambering, leading to refreshing views of the canyon and the surrounding city. Newly installed box steps make it easy to negotiate the sometimes rocky terrain.

GETTING THERE: Parking is available on Elk St. between Bosworth and Diamond Heights Blvd. Or from the Glen Park BART Station, walk five blocks west on Bosworth; turn right on Elk to reach the park entrance. Dogs allowed on leash; restrooms available. [Chelsea Lew]

3 MARIN



JON PAGE

Ring Mountain Open Space Preserve

In the age of the dinosaurs, the now-windswept ridges of Marin County's Ring Mountain lay buried deep beneath an ocean that boiled with subsurface tectonic activity.

The moment you start out on the Phyllis Ellman Loop Trail, named after the Tiburon conservationist who led the effort to save this property from development in the 1970s, you'll be struck by the remnants of that geologic narrative: larger-than-life boulders scattered like islands across a pastoral landscape. And thanks to that past, a large portion of the top of the mountain is made up of serpentinite, the state rock, which weathers into a toxic soil deadly to many plants. But a number of local endemic plants have evolved to survive on serpentine minerals, among them the Tiburon mariposa lily (see page 10), the mountain's floral gem, which lives on the mid-slopes of Ring Mountain and nowhere else on earth.

The trail climbs to the ridge and from there you can wander along the ridge to the east or west, or drop downhill to the south. For all the rocks and flowers, don't forget to look up and out—Ring Mountain has some of the best views you can find of the Bay.

GETTING THERE: From Hwy 101 take Tamalpais Drive east. Go straight onto San Clemente, which merges into Paradise Drive after 0.4 miles. Follow Paradise Drive about 1 mile to the gate opening to the Phyllis Ellman Loop Trailhead. Dogs allowed on leash. [Kaitlyn Kraybill-Voth]



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THE BALLAD OF BODEGA HEAD

Fifty years ago, a small group of activists took on corporate America to keep nuclear power off the North Coast. The battle they fought changed their lives—
and American environmentalism.

BY KENNETH BROWER

In August of 1962, Pierre Saint-Amand, a geophysicist at the China Lake U.S. Naval Ordnance Test Station, left Los Angeles and drove homeward across the Mojave Desert to that vast military base, all sagebrush and alkali in the middle of nowhere. For mile after mile the pale desert slipped away to either side. The geophysicist turned up the radio. KPFK was broadcasting a program produced by its sister station, KPFA, up in Berkeley. The reporter, Joan McIntyre, was describing a PG&E proposal to build a nuclear power plant at Bodega Bay on the San Andreas Fault.

The fight to kill this project would prove epochal in the history of environmentalism, as that new movement was not yet named. The protagonists, many still alive today, lived this history intimately yet have trouble picking the point at which fate stepped in. The tide of battle turned, but when? They offer this Mojave moment as one possibility: in the middle of the desert, a road-weary geophysicist is jarred wide awake by what he hears on the radio.

The electric utility up in Northern California! They planned to site a giant 325-megawatt reactor, the biggest nuclear generator in history, atop the San Andreas, the slip-strike fault that had destroyed San Francisco in 1906!

KATHRYN BARNHART



The dramatic ocean cliffs of Bodega Head are composed of the granitic rocks of the Salinian Block, which has been traveling up the coast atop the Pacific Plate at the western edge of the San Andreas Fault for some 30 million years.

Two years prior to his desert drive, Saint-Amand, on loan from the Navy to the State Department, had been in Chile, helping the University of Santiago set up a graduate school in geology, when he witnessed the biggest earthquake ever recorded. On Sunday, May 22, 1960, at 3:11 in the afternoon, the Valdivia Earthquake, a 9.5, struck Chile's south-central coast. It shook the ground for approximately ten minutes with violence unprecedented since the invention of the seismograph. Long stretches of coastline subsided, sinking under the sea. Mountains fell apart. Huge landslides and debris flows roared down Andean slopes to alter the courses of some rivers and to dam others, creating new lakes. In Chile, Saint-Amand illustrated his fact-finding with his camera: photos of slumping buildings, twisted railroad tracks, coastal towns shattered and then flooded by the one-two punch of earthquake and tsunami. His pictures make a stark record of catastrophe. He had no trouble imagining the consequences on the San Andreas if the Big One—or even a little Big One, like the 1906 quake—seized the containment vessel of a nuclear reactor and shook it like a rat. On reaching home at China Lake, Saint-Amand called David Pesonen, the young man leading the opposition to the nuclear plant. He volunteered to do whatever he could to help.

Bodega Head is a windswept, nearly treeless promontory that shelters, in its lee, Bodega Harbor, the village of Bodega Bay, and the mouth of Bodega Bay. The headlands of the promontory see dense fogs in summer, heavy surf in winter, and a profusion of wildflowers in spring. Offshore, the blows of gray whales peak in January as the whales head south to their warm Mexican lagoons to give birth, and then again in March,

on their migration north to their feeding grounds off Alaska. Overhead, migrating raptors and great flocks of ducks and shorebirds follow similar routes by air.

The headland is made of granite. The rock facing it to the east, on the far shore of Bodega Harbor—which is to say the opposite side of the San Andreas Fault—is softer, more chaotic, and of entirely different origin. The formation over there, on the mainland, is the Franciscan Complex: sandstones, limestones, shales, greenstones, cherts, serpentine, blueschists. Bodega Head bears no resemblance. Like its sister formation, the Point Reyes Peninsula immediately south, the headland is a wandering terrane, part of the granitic Salinian Block, a sliver of the North American Plate sheared off and captured by the Pacific Plate. Both the peninsula and the promontory have been sliding north up the western side of the San Andreas for many millions of years. In April 1906, Bodega Head took a particularly sharp lurch toward wherever it is going.

In the 1950s a thriving commercial fleet fished out of Bodega Harbor: crab, rockfish, salmon, steelhead, halibut. The little town of Bodega Bay had nothing of the boutique fishing village to it, no spas or B&Bs or destination restaurants. It was a gritty blue-collar place. Its dairymen worked the rangeland to the east, and its fishermen worked the California Current to the west.

The biggest landowner on Bodega Head, and among the first residents to learn of PG&E's plans for the promontory, was one of these grounded people, a big, craggy widow named Rose Gaffney. Rose had arrived from Poland by way of Canada around 1911. At 16 she had gone to work for the Gaffney brothers, who owned much of the middle of the promontory. Pregnant and engaged to marry one Gaffney, she lost him on



the day before the wedding to gunfire in a brawl at a Bodega bar. Improvising, she married the other, Bill Gaffney, the brother of her murdered fiancé. It was a happy marriage. Then in 1941 Bill died, too. Rose had run out of brothers and she never married again.

The Widow Gaffney loved the land she had inherited. She knew every rise and indentation of Bodega Head. It was an intimacy reflected best, perhaps, in the enormous lode of Native American artifacts she gathered there. A surface hunter—Gaffney never dug—she spent 50 years combing Bodega Head and the shores of Bodega Harbor: cobble choppers, elk-antler tools, spear points, arrowheads. The Coast Miwok were masterful knappers of obsidian, and the black, crescentic, two-foot-long blades they left at Bodega are surely among the most beautiful objects ever made, as exquisite as Gaffney herself was rough-hewn.

Underneath Gaffney, imperceptible even to her, Bodega Head was migrating northwest about two inches a year—the rate at which a fingernail grows. The science of plate tectonics had not yet been fully born, and early arguments for the theory had not reached the textbooks, much less the Gaffney spread. Gaffney, fiercely protective of her creeping acres, was given to patrolling her borders with a baseball bat. When two PG&E men in suits arrived with offers to buy, she minced no words and sent them on down the road. The warfare that followed was asymmetric, of course. What a powerful electric utility has, and a rural widow lacks, is a big legal department and the power to condemn property by right of eminent domain.

Dr. Joel Hedgpeth, director of the Pacific Marine Laboratory at Dillon Beach, at the southern end of Bodega Bay, was another local to get wind of PG&E intentions early. Hedgpeth's specialty was the *Pycnogonida*, the sea spider, but his interests ranged far more widely than that. He had become one of the fathers of western intertidal ecology. And one of Hedgpeth's perennial tasks was the revision of successive editions of Ed Ricketts's classic on that topic, *Between Pacific Tides*. It was this narrow but rich province—the zone between high tide and low at Bodega Bay—that most concerned Hedgpeth. The University of California had identified Bodega Head as the best site in northern California for a marine research station. The same characteristic that made Bodega Head ideal for a marine lab—peninsularity, with a rocky surf-zone habitat on the ocean

Aerial view of Bodega Head, looking southeast across the tidal flats of Bodega Harbor and Dillon Beach out into Bodega Bay. The nuclear plant was to have been sited in the depression in the Head facing the harbor entrance.

side and a shallow estuarine habitat on the bay side—made it ideal for a nuclear plant. A reactor core, if it is not to go critical and melt, requires great volumes of water to moderate the internal heat of fission. A conventional steam plant,

A conventional steam plant, coal-fired, would be a bad enough neighbor for a marine lab. A nuclear plant, discharging hot effluent into a cold-water marine ecosystem, would be the neighbor from hell.

coal-fired, would be a bad enough neighbor for a marine lab. A nuclear plant, discharging hot effluent into a cold-water marine ecosystem, would be the neighbor from hell.

The university's main contender for the headland was the California State Parks Commission, which had long seen Bodega's cliffs and beaches as potential parks. Abruptly now, with the entry of PG&E, both the university and the parks people abandoned their plans. Joel Hedgpeth had no hard evidence as to why. But it was not hard to guess. The university, since the Manhattan Project, had enjoyed an intimate and profitable relationship with the atom, both wartime and peaceful. In the 1950s a huge chunk of UC's sustenance came from managing two national weapons labs. A former UC chancellor, Glenn Seaborg, was now chairman of the Atomic Energy Commission. PG&E was politically powerful. The dots were there to connect.

In 1958, when PG&E first announced its plans for a power plant at Bodega, it claimed not to have decided between coal and uranium. Hedgpeth doubted that the company had ever wrestled with any such uncertainty. Shortly after the PG&E an-

nouncement, he went public with his opposition to the plant. For a time he had little company; then in late 1961 the company finally announced that the plant would be nuclear and things started heating up.

In February of 1962, Harold Gilliam, the environmental reporter for the *San Francisco Chronicle*, wrote a column, "Atom vs. Nature at Bodega Bay," that lamented the loss of prime coastal parkland to atomic power. Karl Kortum, founder of the San Francisco

Maritime National Historical Park, wrote a widely read letter of protest to the editor of the *Chronicle*. These two newspaper items caught the attention of a regional public beyond Sonoma County. Shortly thereafter, Hedgpeth, Gilliam, and Kortum founded the Northern California Association to Preserve Bodega Head and Harbor (NCAPBHH). They set about the daunting task of stopping the juggernaut of PG&E.

Earlier that same year, two years after his graduation from the School of Forestry at the University of California, David Pesonen was hired by the Sierra Club. His title was Conservation Editor, but he was never quite sure what his actual job was. His degree was in forestry, so he became the Sierra Club spokesman at Forestry Board meetings.

Then one day the Sierra Club's first executive director, David Brower, my father, called Pesonen into his office. He handed the young man two clippings: Hal Gilliam's column on Bodega and Karl Kortum's letter of protest. "In his column, Gilliam treated it as just a lost cause," Pesonen recalls. "But Dave said, 'Well, go look into this. See what you think.' Again, it was the jack-of-all trades kind of thing. I was hired for forestry stuff, and now Brower had me doing nuclear energy."

Pesonen knew nothing about nuclear energy, or Bodega Bay, or the plant that PG&E wanted to build there. He decided to go to the source. Departing the Sierra Club office on Bush Street, he walked a couple of blocks down to PG&E headquarters at 245 Market Street. "Naively," he says. "This was on my own initiative. I went up to the engineering department, on the tenth floor. It was noontime. There was just a secretary there. I said, 'I'm interested in the Bodega case; do you have a file on it?' And she handed me this file." Combatants in the Bodega Bay fight offer this moment—the gift of the file—as another possible tipping point in the campaign against the nuclear plant.

"Can you imagine something like that happening today?" Pesonen asks. "She didn't think there was anything wrong with it, just handing me the file. So I started going through it. I saw a whole lot of correspondence back and forth between the public affairs department of PG&E and the board of supervisors of Sonoma County and other public officials. There were all these indications that PG&E had local government in their pocket. My antennae started to go up. So I copied a lot of this, in handwritten notes. They didn't have copying machines in those days."

There was little organized opposition, as yet, to the nuclear plant. The NCAPBHH had grown a bit, with the addition of Karl Kortum's wife, Jean, and his brother Bill, a Sonoma veterinarian with connections among the county's dairymen. Berkeley professors Joe Neilands and Thornton Sargent threw in, along with several locals. "One was Rose Gaffney, the owner of the property that PG&E was condemning," says Pesonen. "She was a colorful old character. Sort of looked like Bodega Head. We were just a motley group."

The Hal Gilliam and Karl Kortum *Chronicle* pieces had created a stir, and the state Public Utilities Commission responded by reopening the licensing procedure and holding hearings in March 1962. "Their purpose obviously was to just let the public vent," says Pesonen. "And then have PG&E get on with the business that they were determined to do anyway."

So they held these hearings and they were the most chaotic hearings I've ever seen. Completely wild. Anybody in the audience could stand up, and call to be recognized, and then cross-examine the witness."

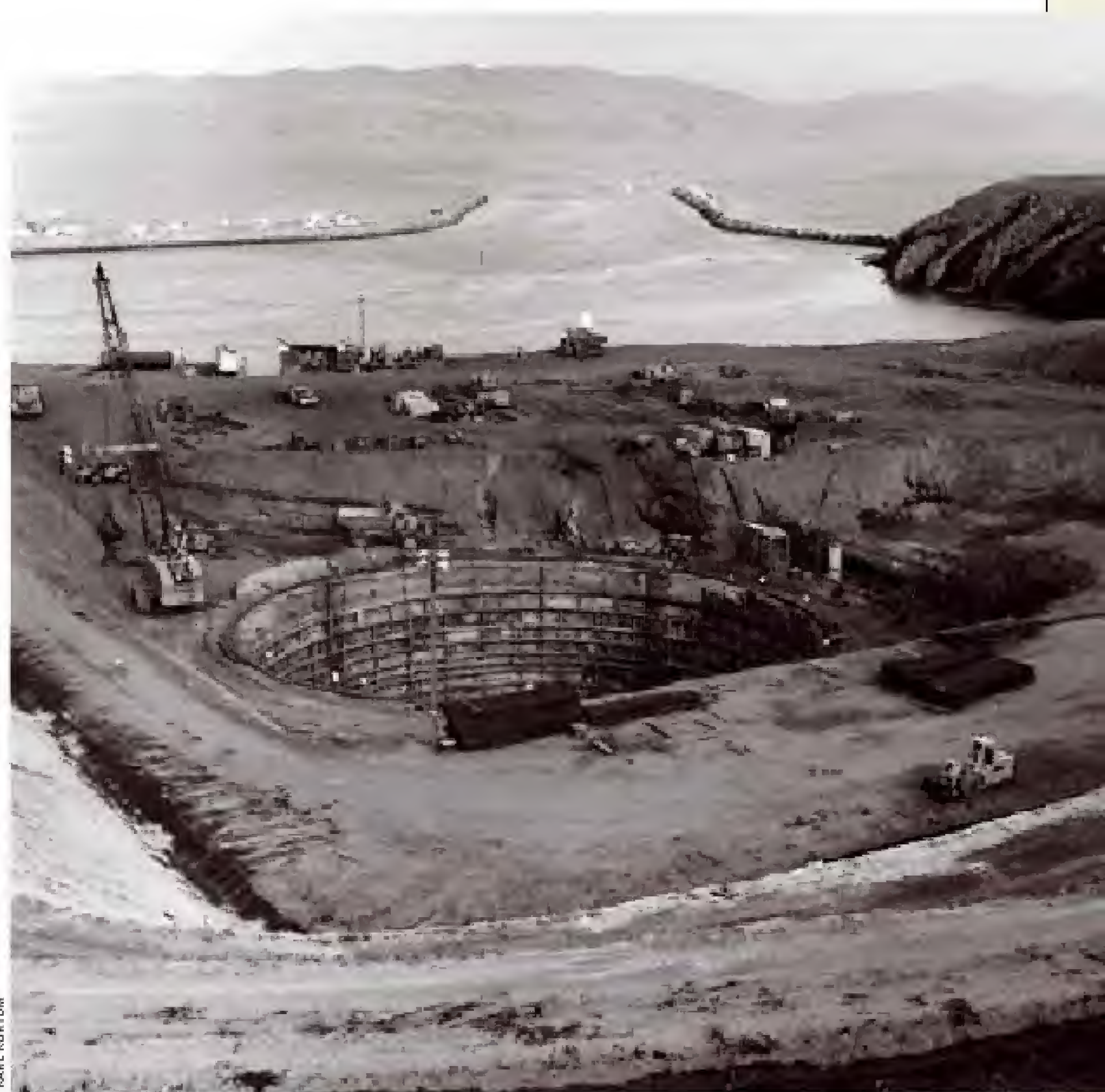
To the hearings Pesonen brought a black briefcase with metal snaps on top. Inside were the notes he had cribbed from the PG&E file. On the basis of these longhand excerpts, he and his faction had leveled charges of corruption against the utility but he had not yet disclosed his source, and at the hearings he waited for a dramatic moment to do so. The PG&E lawyers, in cross-examining him, seemed to sense intuitively that they should avoid this subject. But Pesonen had intuition, too. "I anticipated that they might not ask me, so I planted a question in the audience with a member of our crew, Tony Sargent." If PG&E failed to do so, then Sargent was to stand and ask, "How

do you know all this?"

The moment came. Sargent stood. "What authority, what basis, do you have for these accusations?" he demanded.

Pesonen pushed his briefcase close to his microphone on the dais. He popped the snaps. The twin clicks, amplified, echoed across the hall like rifle shots. Leaning into the microphone, he described how he had come into possession of the file. "You should have seen the flurry of activity at the counsel table for PG&E," he says. "Somebody ran out and got on the phone. Total dismay and chaos on their side of the room. I knew we'd hit a nerve."

Then, on November 10, 1962, the NCAPBHH held a public



meeting in Santa Rosa to gather recruits. If the group was going to stop PG&E, they would have to grow the grassroots resistance well beyond the few blades of themselves.

There was a big turnout, fortunately. About 200 people filed into the hall. It was a crowd very different from any gathering you would see in Santa Rosa today; Sonoma County was much less populous and more rural then. "It had a very interesting mix of people from the whole political spectrum," recalls Doris Sloan, then a Sebastopol housewife, in attendance that day. But the session did not go well initially, Pesonen concedes. "I was the emcee. I could see people starting to get restless. Some started to drift out. We were losing our audience."

Doris Sloan saw it the same way. "The room was pretty packed," she remembers. "There were a lot of speeches. Joe Neilands, the biochemist, got up and talked, spouting numbers.

And David Pesonen spouted information. There were a lot of speakers all telling us why we shouldn't have a power plant there. It was getting very tedious and not very exciting."

The meeting was thrown open to public discussion. Dr. Allen Butler of the California Department of Public Health asked whether PG&E, in addition to a reactor at Bodega, intended to build a fuel processing plant—a considerably more hazardous operation. Pesonen answered that PG&E had not been forthcoming with details. Nobody on the panel knew the answer. But earlier he had spotted Colonel Alexander Grendon at the back of the room. Grendon, whose specialty had been chemical and radiological warfare, was retired from the Army and now serving as Governor Pat Brown's "Coordinator of Atomic Energy Development and Radiation Protection." He tossed Dr. Butler's question to Grendon.

No, the colonel answered, PG&E did not intend to build anything but a reactor. The panelists began asking him questions. First the tone of his answers, and then the content, brought the audience back to life. Listeners who had been slipping out filtered back in and took their seats again.

In response to a question from Pesonen, Grendon explained



(above left) In 1963 PG&E had begun excavation on Bodega Head for the proposed nuclear plant's reactor. This photo was taken by Karl Kortum, one of the founders of the Northern California Association to Preserve Bodega Head and Harbor. Over the succeeding 50 years, the "Hole in the Head" (above) filled in with water, sediment, and plants and became the "Duck Pond."

AEC procedure. "The hearing examiner will listen to nobody who is not qualified to speak," he said. "The general public will not be permitted to testify because they will not be able to demonstrate the expert competence that will be required."

Was it true, Pesonen asked, that an AEC witness, besides having to prove technical competence before the AEC examiner, in some situations had to be represented by counsel? Grendon denied it. "No," he said. "Let me set the record straight on that. You don't need to be represented by counsel, and any statement you make will be received. The question is, what will follow

from its being received."

"You mean, will it be listened to?"

"You will be heard. I simply cannot predict how much effect it will have on the ultimate result. I think in most cases it will have relatively little."

The crowd grew increasingly restive. It is curious how democracy can doze off and then suddenly thrash wildly awake again. Colonel Grendon, for his part, seems to have grasped that insurgents were outflanking him, but he was incapable of adjusting his tactics.

"People got up and started shouting, they were so angry," recalls Pesonen. "It became just a hell of a meeting."

Some combatants in the Bodega fight pick this as the decisive moment. The tide of battle, they suggest, turned less from any clever ambush by their own side; rather, the colonel fell victim to his own friendly fire. Flipping the lever of his M14 to full automatic, Grendon riddled his own boots.

"It was like a matador waving a red cape," says Doris Sloan. "You don't tell the citizens in the early sixties in Sonoma County not to be concerned about their environment and their safety and the health of their kids. You don't tell them to let the government and scientists make decisions for them. That was the catalyzing moment. Not just for me, but for many others in Sonoma County. We decided we're not going to let Grendon and PG&E tell us how to live our lives. I was so outraged. I get angry just thinking about him standing up and telling me to keep my mouth shut. And the next morning at dawn, literally, I was on my way to a Quaker meeting in Berkeley and I knocked on Dave Pesonen's door. Woke him up, as I remember. I said, 'Here I am, what can I do?'"

Mrs. Sloan became Sonoma County coordinator for the NCAPBHH. Her job was to rally the troops and keep them informed. She arranged meetings, scheduled interviews and speaking engagements, wrote newsletters, put out information packets developed by the association. She worked out of her house. Three of her four kids ("we all had four kids in those days") were in school, which freed up a few hours each day. She spent much of her time on the phone.

The NCAPBHH campaign gained momentum. The association launched a recall campaign against Sonoma County supervisor E. J. Guidotti, accusing him of colluding with PG&E. Picnics had become the main organizing and recruiting tool. The association published a pamphlet describing how radioactive fallout is concentrated by grazing cows and ends up in milk. They knocked on doors and passed out leaflets. Sonoma State College students staged a sympathy march. Musicians, for some reason, were drawn to the campaign in disproportionate numbers. The folksinger Malvina Reynolds wrote and sang antinuclear songs for the opposition. Lu Watters, a trumpeter who had played New Orleans jazz in San Francisco, became a staunch ally.

"It was Lu's wife, Pat, I think, who came up with the idea for the balloons," says Doris Sloan. "In the Bay Area on most afternoons the winds pick up off the ocean, blow east, and cool

us off. Well, Pat had the idea for a party up on Bodega Head, on the bluff above the reactor pit at Campbell Cove. Wouldn't it be fun to take some helium-filled balloons and release them, to show ordinary people which way the wind blows from the plant?"

On Memorial Day of 1963, around 300 people and a flotilla of helium balloons converged on Bodega Head. Lu Watters lured an old friend and colleague, the jazz trumpeter Turk Murphy, from his normal venue in San Francisco, Earthquake McGoon's. The folksinger Barbara Dane sang a song written for the occasion, "Blues Over Bodega." As Bodega Head rocked, the protesters released 1,500 helium balloons. Attached to each one was a tag: "WARNING! This balloon could represent a radioactive molecule of Strontium-90 or Iodine-131. It was released from Bodega Head on Memorial Day 1963. PG&E hopes to build a nuclear reactor plant at this spot, close to the world's biggest active earthquake fault. Tell your local newspaper where you found this balloon."

The balloons blew all over the dairy country of West Marin and Sonoma County. Ranchers stooped in their pastures to turn the tags over—"Strontium-90, Iodine-131"—in rough brown hands. Balloons blew into downtown San Rafael and one landed in the Civic Center fountain. Regional newspapers featured the stunt, and radio stations downwind of Bodega were besieged with calls.

In April 1963, Pierre Saint-Amand, the Navy geophysicist, arrived to investigate the geology of Bodega Head. It fell to Doris Sloan to show him out to the site. It was a rainy day. The two drove around the harbor on Tidelands Road, which PG&E had constructed out to the project. The site was fenced and guarded, and on the drive out, Sloan and Saint-Amand discussed the problem of getting in. If necessary, Saint-Amand said, he would show his credentials as a government scientist. He pulled out his wallet for Sloan's inspection. The various ID cards looked impressive enough to her.

But when they reached the gate, it stood open. The security kiosk was empty. All work had ceased in the rain. Sloan and Saint-Amand exchanged glances. Her eyebrows asked, "Shall we?" His said, "Let's go." It was the episode of the helpful PG&E secretary and the gift of the file all over again: No one was guarding the fort.

PG&E had been granted a permit for site preparation but not for construction. They dug a pit for the reactor 100 feet deep and rimmed the interior with wooden forms for the concrete—preparation—but they had yet to pour the concrete, as that would have been construction. Campbell Cove was steep-sided, so the company had bermed the reactor hole. The homemaker and the geophysicist set out along that northern berm. "We had walked halfway when Pierre stopped," Sloan says. "He pulled out his pocketknife. He said, 'Doris, come and look at this.' He

plunged his pocketknife into a two-meter-wide zone of what's called a 'fault gouge.' That's ground-up rocks formed when faults move. The movements mush up the rocks. Pierre said this looked like an active fault, a small strand of the San Andreas. You turned around and it went straight smack through the center of the pit."

This, some argue, was the decisive moment. Saint-Amand's pocketknife stabbing into fault gouge, according to this theory, was the dagger through the heart of the project.



KATHRYN BARNHART

Looking northwest across the bluffs of Bodega Head to the Bodega Marine Laboratory and the Pacific Ocean.

Afterward Saint-Amand made a formal request, as a government scientist, for aerial photographs of the site. If he proved brilliant at identifying small, distant features of fault ruptures in those aerial photos, then perhaps it was because he had ground-truthed them in advance. He returned to the site officially several times with colleagues for further inspection, and wrote a report, "Geologic and Seismologic Study of Bodega Head." The AEC staff, given Saint-Amand's eminence, was compelled to call in the United States Geological Survey. USGS investigators verified his findings, as did other geologists who followed. Meanwhile, the lobbying campaign against the plant gained steam. Governor Pat Brown and Senator Thomas Kuchel came out against the plant. Representative Phillip Burton and Secretary of the Interior Stewart Udall stepped in. PG&E saw the writing on the wall, surrendered, and withdrew its application.

"The Hole in the Head Gang," the press dubbed the motley crew at NCAPBHH for the empty reactor pit that is their monument. The gang had won.

Today Bodega Bay is protected as part of the Gulf of the Farallones National Marine Sanctuary. The beaches and dunes along the south side of Bodega Head are now Sonoma Coast State Beach. The inshore waters off the promontory are Bodega

Head State Marine Reserve and Bodega Head State Marine Conservation Area. At Horseshoe Cove, which 50 years ago Joel Hedgpeth called the “crown jewel” of Bodega and “an ideal marine laboratory site,” there now stands, indeed, the Bodega Marine Laboratory. The lab is run by the University of California at Davis as a part of UC’s Bodega Marine Reserve.

For Doris Sloan, her trespass with Pierre Saint-Amand at the reactor site was pivotal, “an absolutely incredible day, not only for the fight for Bodega, but it changed my life, too.” Watching Saint-Amand sink his pocketknife into the fault gouge was one of the inspirations for her eventual return to school to study geology. In 1975, she received her master’s in geology from UC Berkeley and became a lecturer in environmental sciences there. She often brought her classes out to Bodega Head, and she takes groups there still. At the reactor pit she can no longer point out the fault gouge that Saint-Amand probed, for the berm and its surrounding terrain have become completely overgrown. But the gross features of the San Andreas fault zone are still manifest to the east. The pit makes a podium from which Dr. Sloan can tell the story in situ, a lesson in political geology taught at its very epicenter.

The Hole in the Head has filled with rain-water and is now most often called “the Duck Pond.” PG&E pulled out with little remediation of the site, except to bulldoze surface rebar and rubble into the pit. The ruins of the

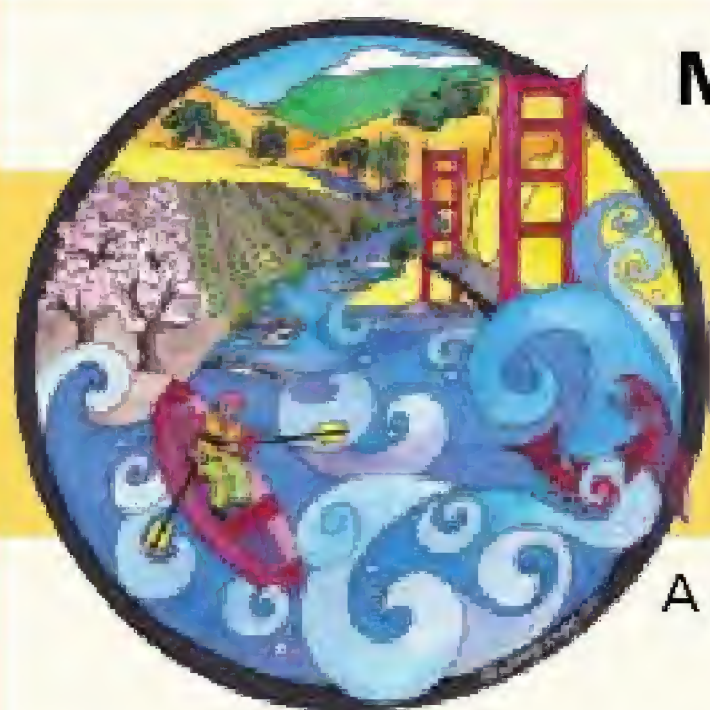
stillborn reactor lie quite deep. No trace shows at the surface. Migratory waterfowl see the pond as just another of the thousands of bright, reflective way stations along the Pacific Flyway. Widgeon, teal, buffleheads, scaup, ruddy ducks, and other migrants drop down for pit stops. They dive or dabble for a while. Then the Arctic calls them again, or Argentina speaks from the other direction. They make their web-footed runs across the surface, each bird trailing a line of white splashes on the dark water. They lift off and resume their journey north or south. 🦆

Berkeley-based nonfiction writer **Kenneth Brower**, the eldest son of environmental leader David Brower, is the author of more than a dozen books about people and the environment. His latest book is *Hetch Hetchy: Undoing a Great American Mistake* (Heyday, 2013). He is currently working on a book about the battle to save Bodega Head.

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RANGE OF POSSIBILITIES

BY KELLY CASH



Rangelands, Ranching, and Conservation in the Bay Area

At the Yolo Land and Cattle Company, some 80 miles northeast of San Francisco, along the eastern base of the blue-green massif known as Blue Ridge, butterflies and cattle move across a blond sunbaked plain on a warm summer day. There are swallowtails, sulphurs, skippers, and a herd of ebony Angus cattle. A swallowtail flickers across an empty chair, wing dots dancing, right “where Hank used to sit, right there, where the breeze blows through every day like clockwork,” says Karen Stone, a

Rancher Doniga Markegard and her husband, Erik, raise their grass-fed Belted Galloway cows on a 1,000-acre ranch on the San Mateo coast. Galloways are a heritage breed from the coast of Scotland that has a double coat of long hair to better shed the rain.

“The rangelands in the Bay Area are incredibly important for wildlife and native plants. They provide the landscape connectivity that species need to move from place to place, which is especially critical in a time of rapidly changing climate.”

Dr. Reed Noss, former president of the Society for Conservation Biology

petite brunette of Italian descent who owns and manages the 13,000-acre operation with her husband, Scott, along with Scott’s brother Casey and his wife Angela.

“Hank” is father-in-law Hank Stone, who passed away at 84 last year. His presence in California’s agricultural community was legendary, and there is a lingering sense of loss, the feeling that he was in his prime, happy to wake up every day with so much more to do. One of the projects he was most proud of is a conservation easement he worked out with the California Rangeland Trust to protect his beloved ranch forever by prohibiting future development.

Hank was an alliance builder, willing and able to work with all kinds of people. Karen and Scott continue that tradition. Nine years ago, Audubon California approached the Stones because the group’s biologists had identified a problem: Suitable habitat for overwintering waterfowl was being lost to development. The Stones’ work on restoring riparian areas had already helped neotropical migrant songbirds. Would they help out overwintering waterfowl by enhancing the habitat of one of their stock ponds? With funding from private and public partners, the Stones restored a large pond and added a hand-carpentered goose-nesting platform. Now they’re partnering with the nonprofit

Point Blue Conservation Science to monitor and evaluate the results of their efforts in terms of both bird and plant diversity. They've also been part of scientific field trials involving rangeland carbon sequestration. And they use recycled rinse water from a nearby Campbell soup cannery to irrigate their pastures. So for people who are looking at the whole picture of Bay Area ecology, the Stones and other ranchers like them are not just stewards of their ranches; they're also "value-added" stewards of a significant component of the Bay Area environment—rangelands—that makes up more than 40 percent of the open space in this metropolitan region.

BAD COW, GOOD COW

So if ranchers are such great conservation partners, why has ranching often been viewed as bad for the environment? Part of the answer lies in the history of ranching in the state. The Spanish colonists who first introduced ranching to California in the late 1700s also introduced nonnative annual grasses that outcompeted the native perennial grasses and led to a severe loss in biodiversity. And in the decades that followed, incidences of poor range management—overstocking and overgrazing—resulted in soil compaction, erosion, and mismanagement of riparian and wetland areas that reduced habitat for bird species and aquatic life. So vivid were the results of such mismanagement that it became difficult for the environmental community to see the benefits of good management. Any grazing, well-managed or not, was viewed as the antithesis of good environmental stewardship.

The environmentalist perspective was that to get the benefits of clean water, wide-open vistas, and healthy wildlife, society needed to set aside open space as public parkland and remove nonnative ungulates (hooved grazing mammals) so the land could heal and return to its native state. But now, after more than a decade of research on the question, it's becoming clear that well-managed private ranchlands can provide these essential public benefits, at little cost to the public, while at the same time ensuring that the land remains economically productive. Chronic underfunding means that public agencies generally lack the resources to properly manage all of this rangeland even if "we, the people" could afford to buy it all, which we can't.

Sasha Gennet is a senior scientist with the Nature Conservancy of California, which works to assemble and manage large protected landscapes for biodiversity and climate resilience. "Managed rangelands are so important for both natural and human communities," she says, "from the fresh water that flows off them into creeks and reservoirs to the weed-munching services provided by cattle, which helps keep the wildflowers blooming and the native frogs and salamanders breeding. And keeping ranchers in business means that the land doesn't end up getting paved over."

WORST OF TIMES; BEST OF TIMES

Of course, "keeping ranchers in business" in the 21st century is a challenge, particularly in the Bay Area. Real estate values

and population growth favor land fragmentation; estate taxes fall hard on land-rich, cash-poor ranchers after the death of family members; cattle prices are subject to the vagaries of a global market; and purchases of former ranches by public agencies can put them off-limits for grazing. And then there's the current drought and the specter of climate change.

But there is a flip side to this tsunami of challenges. The land trust movement now views protecting ranchlands as essential to large-scale habitat protection, and many land trusts have "working lands" programs. The locavore food movement has spawned a market of consumers interested in eating foods grown close to home in a sustainable way, as well as a new appreciation for the people who are producing that food. And scientists working to address climate change have demonstrated that rangelands sequester greenhouse gas and have the potential to sequester even more when specific management practices are used. At a national level, "carbon offset markets" are in development, so that ranchers who take care of their land and avoid converting it to other uses could potentially receive financial benefits.

This spirit of innovation is spreading, and throughout the region many people involved in land conservation are seeing the upside of integrating privately owned and managed ranches into strategies for preserving biodiversity and open space.

CRITICAL LANDS

In 2011, a consortium of 125 nonprofits, scientists, academics, and public agencies working under the auspices of the Bay Area Open Space Council presented "a vision for the region and how we can work together to preserve biodiversity," according to council deputy director Annie Burke. The Conservation Lands Network report was, in essence, a blueprint for determining the lands that should be prioritized for protection. Over four million acres were studied, integrating over 1,000 variables, from red-legged frogs to redwood forests to migratory linkages to climate mitigation. When all the data was crunched, rangelands popped up again and again as priority areas for conservation, comprising more than 60 percent of the 1.1 million acres deemed "critical lands" in need of protection. "The report showed us that rangelands support a significant percentage of the biodiversity extant in the Bay Area," says Burke.

Going deeper, the nonprofit California Rangeland Trust found that approximately 585,000 acres of rangeland in the nine Bay Area counties and Santa Cruz are already protected

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(above) Cattle being driven to a stock pond at the Yolo Land & Cattle home ranch east of Lake Berryessa. (left) Rancher Greg Schmid checks out the organic matter in his field under the watchful eyes of his grass-fed cattle.

from development through direct ownership by public agencies and nonprofit land trusts. Another 150,000 are protected under conservation easement, meaning they are privately owned but prohibited from being developed. "The remaining 1.3 million acres are privately owned but provide numerous public benefits," says Nita Vail, CEO of the trust.

MAMMOTHS AND COWS

Flying over at 30,000 feet, one can easily visualize the Bay Area rangelands' ancient beginnings. Rangelands dominated the region throughout the Pleistocene, which ended only 10,000 years ago, the mere blink of a geologic eye. In 2005, E. Breck Parkman, a senior ecologist for California State Parks, wrote

in a paper entitled "The California Serengeti" that "the African Serengeti [of today] pales in comparison to the [prehistoric] Bay Area in terms of the diversity and density of grazing species in one place." It was "one of the greatest natural phenomena of all time," he added. Even the Bay itself was not a bay, but a vast grassy plain with a river cutting through it, emptying into the Pacific Ocean at the continental shelf, near the Farallones. The entire region was so fecund with perennial grasses that it supported and attracted thousands of herbivores, including Columbian mammoths, whose remains continue to pop up in places like downtown San Francisco and suburban San Jose.

Most of the native species that grazed and shaped those Pleistocene rangelands have been gone for millennia, except for deer, tule elk, pronghorn, and the handful of bison in Golden Gate Park. But for the past 200 years, since the arrival of the European settlers, *Taurus bos*, an ungulate domesticated on the other side of the world 10,500 years ago from wild aurochs, has been the grazer of choice. But cows are a different kind of grazer with different habits than elk or bison. Herds of cattle left on their own can overgraze an area. And yet domestication means that their patterns of movement on a landscape can be guided. And the last 30 years of both conservation biology and range science have made it abundantly clear that while poorly managed cattle can significantly disrupt and harm rangelands, well-managed grazing is an important tool for managing these lands in the absence of the large wild ungulate herds of yesteryear.

NOT YOUR MOTHER'S RANCHERS

"We try to manage our cattle herd to simulate the large herds of elk and antelope that once roamed California's grasslands," says Doniga Markegard, one-half of the husband-and-wife team that runs family-owned Markegard Family Grass-Fed, on the coast side of the Santa Cruz Mountains. She had a background in nature-based education and permaculture, with experience as a wildlife tracker, when she met her husband, Erik Markegard. He is a sixth-generation rancher raised on a 2,000-acre ranch in San Mateo County owned by musician Neil Young, where he learned the ropes by helping his father manage the ranch. After Doniga and Erik got married, they moved on to a nearby ranch on the San Mateo coast where Erik had been raising his own cattle since 1987.



STACY COMPTON

Many conservation organizations with rangeland holdings work with ranchers to steward their properties. Save Mount Diablo leases grazing rights for its Curry Canyon Ranch on the south side of Mount Diablo to rancher Carissa Koopmann Rivers.

retention by 15 percent over a five-year period could save enough water to twice fill Hetch Hetchy. And then there's the Marin Carbon Project, whose three-ranch demonstration project in West Marin has shown how the timely application of organic compost to grasslands can dramatically increase both forage production and carbon sequestration.

"It's exciting to be at the center of so much creative thinking," says Wendy Millet, director of the TomKat Ranch Educational Foundation.

THE ECOLOGY OF A PASTURE

The conversations at TomKat are part of the growing movement to find more ways for ecologically sustainable ranching to be more economically sustainable, and vice versa. Another player in the field is Panorama Organic Grass-Fed Meats, founded in 2000 by four Northern California ranchers, including Darrell Wood. He was already respected in environmental circles for his work protecting vernal pools on his property in Northern California, populated by endemic fairy shrimp and tiger salamanders. But respect didn't pay the bills, so he helped start Panorama to make sure grass-fed meat producers could find markets willing to pay the additional costs of going grass-fed and organic. Fifteen years later, Panorama sells to over 200 Whole Foods Markets and many smaller stores, giving ranchers in the grass-fed niche a marketing and distribution network that extends into nine states.

Panorama's market access and ability to support the switch to organic pasture was one of the factors that attracted Greg Schmid of Los Rios Farms. Schmid and his family live in a buttercream yellow house near Winters, set back from the county road and surrounded by pasture. On a hot fall day he invites a visitor into an old-fashioned parlor, almost from another century in its sense of comfort, quiet, and tranquility.

Though a more traditional rancher than the Markegards, Schmid is similarly fascinated with "the ecology of a pasture," he says, gazing out at one of his from a window seat. "That's the key, the organic matter; it reflects the type of grazing that

Both Doniga and Erik are keenly attuned to the value of healthy food and healthy landscapes. They guide the grazing of their cows and sheep using movable electric fences to avoid overgrazing and soil erosion, a practice known as holistic management (HM).

Doniga is an eloquent spokesperson for the culture she believes ranching embodies: "the values of family life, open space, and wildlife." Their children—ages 12, 8, 6, and 4—all help with ranch operations. Even the youngest can shout up the hill, loud and determined, in just the right way to call in their herd of Belted Galloway and Angus cows.

To an outsider it looks like an impossibly ideal life. But the challenges are formidable. First of all, there's the challenge of assembling enough pasture to maintain a minimum viable operation. They graze their livestock on some 8,000 acres, but their home ranch (which they don't own but lease from the Midpeninsula Regional Open Space District) is only 1,000 acres. The other 7,000 acres are leased on various properties in San Mateo and Sonoma counties. Managing that kind of far-flung operation takes a lot of work: trucking cows around, applying for permits, writing lease agreements. According to Doniga, they've nearly doubled their grazing acreage in recent years but because of the drought, their production has stayed the same. Then there's the challenge of processing the meat and, finally, getting it to market, which they do direct to consumers via their website, ongoing scheduled customer deliveries, and farmers' markets. And they do everything themselves, 24/7.

The Markegards and other Bay Area ranchers trying to hold on to the ranching way of life in the 21st century have an unprecedented opportunity to share ideas and challenges through a series of discussions being hosted down the road at the TomKat Ranch, where the conversation is as important as the beef. TomKat has become a learning lab, pushing new research out and bringing important information in. One recent study by ranch scientists shows grazing experiments that resulted in a marked increase of native perennial grasses. A related project, Point Blue's Rangeland Watershed Initiative, promotes range management methods that increase soil water retention while also increasing grass production and carbon sequestration. Data indicates that increasing water

WHAT IS RANGELAND?

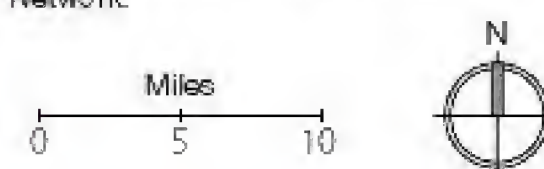
What are "rangelands"? Many people confuse rangelands with grasslands and grazing lands. As defined by UC Cooperative Extension, California rangelands include annual and native grasslands, and also many types of oak woodlands and shrublands that are suitable for livestock grazing, whether or not they are currently being grazed.

BAY AREA RANGELANDS

- Private Rangelands
(~1,200,000 acres)
- Conservation Easements
(~150,000 acres)
- Public Agencies and
Nonprofit Organizations
(~585,000 acres)
- Other Protected Lands
- Urban
- Other Private Lands

Acreage figures do not include Yolo County.
Data sources: California Protected Areas
Database (2014), California Conservation
Easements Database (2014), and
Conservation Lands Network Vegetation
Map (Bay Area Open Space Council).

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you do. The greater the organic matter, the better conditions are for everyone. Cows, wildlife, dung beetles, the whole cycle of life. There are all kinds of stories going on out there.”

Schmid's work is “more like being a farmer than a rancher,” he says. He has ranched on native pasture and irrigated pasture, but prefers a mix of natives and nonnatives, what an ecologist would call “a novel ecosystem.” He uses a mix of plants “that the cattle think are delicious—alfalfa, clovers, annuals, ryegrass—and that will put weight on them. I use rotational grazing and move them around. If you keep cattle on a piece of land for too long, they eat and trample the vegetation to the nub, and destroy the ‘solar component’—the leaves that capture sunlight and rebuild.” How often he moves the cattle depends on soils, vegetation cover, and weather. “If you leave cattle on



a wet pasture for too long their hooves can scar and pock the whole pasture, and when the soil dries out it gets too compacted to grow anything," he says. Schmid moves his cattle on foot or on ATV, or sometimes, "once they know the routine," he'll just open a gate and say, "Here cow!"

RAISING SALAMANDERS AND BUTTERFLIES

While the grass-fed niche in the Bay Area is small and growing—nationally grass-fed beef captures only 5 percent of the market—it is the traditional ranchers who also manage for sustainability that have the capacity to protect the largest and most intact swaths of the remaining rangelands. In the East Bay, Seth Adams, land conservation director of Save Mount Diablo (SMD), works on stitching together a "national park-size conservation-managed area around Mount Diablo; not state park size—*national* park size," he emphasizes, with public and private land all under some form of conservation management. Adams says that SMD owns 20 properties, and "we graze most of them." He adds, "As long as neighbors stay in ranching, I can focus on protecting properties that are being sold for development." Adams sees ranchers as added conservation value: "Many of the ranchers I know have been here for decades and they are the best naturalists I know; they know the area like the back of their hands." These ranchers show that holistic management is not the only path to a sustainable landscape. Traditional ranchers who have been able to stay on their ranches are attuned to forage, livestock, and ecological interactions, and they move their cattle not with electric fences but with distributed water sources and salt blocks.

Like many conservation activists, Adams only came to appreciate the role of ranchers over time. "I started working for Save Mount Diablo in 1988 and worked hard to eliminate ranching from Mount Diablo State Park. There was a big huge fight about taking grazing off the park." But during the decades after the battle was won and the cattle were removed, Adams saw firsthand "that some landscapes benefited and some suffered, and the new science coming out supported the idea that some landscapes needed grazing." Adams also realized that "grazing is a cheap way to manage fire fuel" as he took on the challenge of managing fire-prone areas.

One of SMD's lessees is Carissa (Cari) Koopmann Rivers, part of the well-established Koopmann ranching family that has been recognized for environmental stewardship at their home ranch near Sunol. She is also ranch manager of Audubon's 6,700-acre Bobcat Ranch near Winters. There, she oversees enhancements in cattle grazing and wildlife habitat. Adams says Rivers "is managing grazing using ecological principles to bring properties back to better health and she's interested in how the ranching community continues into the next generation." She's raising the bar, in both her management of springs and grasses and in her ability to connect with people—and her cattle are beautiful.

But as a young rancher, Rivers encounters formidable barriers, such as the lack of affordable grazing land. "We



STUART B. WEISS

can't compete with the big operators," she says, "or bid as high as them, so if we do find ground, it's so far away or so small that it doesn't make sense economically because we can't run enough cows, or it needs so much work in terms of water development, fence repair, noxious weed control, etc."

Like her brother Clayton who works as a rangeland ecologist at the Midpeninsula Regional Open Space District, Cari also works two jobs and drives long hours to tend cattle at multiple sites in order to make a living. "From my house to Mount Diablo, it's 68 miles. I drove about 10,000 miles in 2014 just to check on cattle, develop water, fix fences, and meet with Save Mount Diablo staff."

One of the sites she visits is the Koopmann family ranch, located between Highway 680, a golf course, and several ranchettes, one with a helipad. Because of the area's high property values the family was hit with a substantial estate tax bill after Cari and Clayton's grandparents passed away. But parents Tim and Melinda Koopmann were determined to keep the ranch intact, and working with the California Rangeland Trust, they found a way to do that by selling conservation



STUART B. WEISS



SALLY RAE KIMMEL

(Above left) Studies have shown that managed cattle grazing can benefit native wildflowers, such as these growing profusely on the nutrient-poor serpentine soils of Coyote Ridge. (lower left) A federally listed bay checkerspot butterfly nectars on a *Cryptantha* on Coyote Ridge. The Tilton Ranch (above), owned and managed by Janet Burback (below), sits across the Coyote Valley from Coyote Ridge and is a key link in a potential wildlife corridor between the Diablo Range (the high ridge to the east) and the Santa Cruz Mountains to the west.



SALLY RAE KIMMEL

easements on parts of their ranch to protect several listed species, including the California tiger salamander. “California tiger salamanders are the most lucrative livestock I’ve ever raised!” Tim says.

Tiger salamanders aren’t the only federally listed species getting a helping hand from managed grazing. Biologist Stuart B. Weiss of Creekside Center for Earth Observation likes salamanders, but his true passion is the threatened bay checkerspot butterfly. To talk with him is to shape-shift in scale down to dirt level, a kind of “Honey, I Shrunk the Kids” vantage point that turns grasslands into a place of microfaunal jungle odysseys. For Weiss, everything about well-managed grazing programs—public or private, holistic or not—on the region’s unique serpentine soils is good news. Without cattle to crop the nonnative, annual grasses, the area would become a thatch of impenetrability, stifling for the native host plants of the checkerspot larva and impassable for salamanders and frogs.

As an added bonus, the annual grasses on Coyote Ridge south of San Jose—the last major refuge for the checkerspot—absorb smog-forming gases from nearby Highway 101 and Silicon Valley; grazing by the cows helps remove tons of nitrogen from the ecosystem every year. “My haiku is: Cows graze quietly / Grasses remove smog from air / Many butterflies,” says Weiss.

Weiss has worked closely for years with nearby rancher Justin Fields, who grazes his cows on Coyote Ridge, parts of which are managed by the Santa Clara Valley Open Space Authority. It’s not only critical habitat for the checkerspot, it’s also part of a key wildlife corridor between the central Diablo Range—a huge swath of privately and publicly owned wildlands where mountain lions prey on tule elk—and the forested Santa Cruz Mountains to the west. In between, however, are the Coyote Valley and Highway 101, and if you’re a four-legged creature looking to find a mate or prey, it’s basically the mother of all corridor challenges.

THE CORRIDOR CONNECTION

Assembling a viable corridor across the Coyote Valley is the dream of Andrea Mackenzie, general manager of the Open Space Authority. “One day,” she says, “there could be a protected corridor all the way from the Diablo Range and Coyote Ridge to the east, across our Coyote Valley Open Space Preserve to the Santa Cruz Mountains on the west.”

Key to that dream is the 2,700-acre Tilton Ranch, owned by the Baird family. Janet Baird Burback’s great grandparents bought the parcel in 1917, when the valley was still wide open. Burback is a traditional rancher who also raises some grass-fed beef on the side for family and friends. Her ranch is one of the last holdouts against a tide of development sweeping south from San Jose. Because of its strategic location, Tilton Ranch is part of the area dubbed “an essential corridor link” for wildlife by the Living Landscapes Campaign of five South Bay conservation nonprofits.

But ranching is a difficult business, and Burback and her family have had to sell portions of the ranch to generate

additional revenue. In the late 1980s her grandmother sold a 350-acre parcel to developers. But the development plans never panned out, and in 2010 the Open Space Authority purchased the property, which will open to the public in the summer of 2015 as Coyote Valley Open Space Preserve.

Part of the preserve's ongoing management plan calls for leasing it to local ranchers, including Burbuck and Fields, reflecting the authority's mission to preserve open space for both public recreation and agriculture. "Partnerships with ranchers like Janet and Justin are essential," Mackenzie says. "The health of our natural landscapes and ranching are inextricably linked."

These new alliances make Lynn Huntsinger very happy. A professor at UC Berkeley's Department of Environmental Science, Policy, and Management, she's been studying the intersection of ecology and ranching since 1983. "Sustaining rangeland ecosystems is as much a social process as an ecological one," she says, "and alliances are key to creating sustainable rangeland landscapes." She believes that "cultural differences must be overcome, so that each side begins to understand the other's point of view. Where you can get different landowners working together across property boundaries, where the public and private lines disappear, you can support learning about the ecosystem for the common good and get conservation management taking place on a landscape scale. That's where the magic happens."

Huntsinger is one of more than 100 scientists, public agencies, and nonprofits who have signed up to be part of the California Rangeland Conservation Coalition. Director Pelayo Alvarez, Ph.D., says the goal is to "keep ranchers ranching." Alvarez spoke at a state-sponsored Climate Adaptation Forum, brimming with climate activists, in late 2014. "We need to make it easy for ranchers to do the right thing," he said, and proceeded to tick off his priorities: facilitate the permitting process; increase the amount of leasable land on state parks; and establish common conservation goals with ranchers backed up by policy, financial incentives, and technical support. "We must reduce the barriers to implementing true rangeland



COURTESY CALIFORNIA RANGELAND TRUST

This stock pond on the Koopmann family ranch near Sunol supports a healthy population of the endangered California tiger salamander, along with the family's herd of Red Angus cattle.

conservation if we are to achieve real climate resilience in the Bay Area and all of California," Alvarez told the crowd.

When you listen to evangelists like Huntsinger and Alvarez and ranchers like Doniga Markegard and Cari Koopmann Rivers, the range of possibilities seems endless. It's clear that a movement is growing that views well-managed rangelands as hidden assets, private lands yielding both ecologically measurable and intangible public benefits. But real hurdles remain, especially when environmental concerns and rancher needs conflict. And for the dwindling number of ranchers left in the Bay Area, there is concern about maintaining a local ranching economy large enough to support basic services like veterinarians, feed stores, truckers, and equipment vendors. Meanwhile, drought and climate change cast the longest shadows.

But ranchers in the Bay Area are a committed group, and the opportunities for innovation and collaboration are growing. With a new generation creating powerful alliances and connections with the food-conscious urban population, it makes one wonder if, like the spirit of Hank Stone, the answers to some of the Bay Area's toughest food and environmental challenges might just be hidden in plain sight, right where the cows are grazing. 🐾

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For additional coverage of rangelands, ranching, and conservation (including interviews with ranchers, discussion of ranching's carbon footprint, and social media views of cows in public parks) go to baynature.org/rangelands.

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The California Rangeland Trust, a 501(c)(3) nonprofit organization, was founded in 1998 by a group of innovative cattlemen and -women, to conserve the open space, fresh air, clean water, and wildlife habitat provided by working lands. Using conservation easements, the Rangeland Trust has protected 283,000 acres of privately-owned rangeland throughout the state. For more information and to see videos of Rangeland Trust ranchers, visit rangelandtrust.org.

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Wildlife Parenting

Four animals share their strategies for raising young in the East Bay Regional Parks.

BY ROBIN MEADOWS

Is there anything better than spring in the Bay Area? Not to me. I love the lush green hills that roll on forever, the oaks as they leaf out, and the wildflowers that return like old friends year after year. But some of the greatest wonders of the season are hidden from sight. Tucked safely away—in narrow rocky crevices, high atop trees, submerged under water, and deep in the ground—animals all over the Bay Area are raising families.

Of course, animals looking to raise the next generation see the landscape differently than people enjoying a perfect spring day in the park. We might be on the lookout for a nice flat place with a view where we can stop for lunch. But what do animals want, given that they depend on the land around them to mate and rear their young? For a different view of the landscape, consider the needs of four animals—one mammal, one bird, one amphibian, and one insect—that live in the 119,000 acres of the East Bay Regional Park District (EBRPD): bobcats, great horned owls, newts, and rain beetles. They're all doing the same thing—trying to pass on their genes—but the resources and features they need do this differ considerably.

A mother great horned owl and her chick watch from their cavity in a cliff.

BARRY GRIVETT, SAN JOSE, CA

EXPLORING THE EAST BAY REGIONAL PARKS
This story is part of a series exploring the natural and cultural history and resources of the East Bay Regional Park District (EBRPD). The series is sponsored by the district, which manages 119,000 acres of public open space in Alameda and Contra Costa counties.



BOBCATS...Going Solo

Bobcats are equally at home in forests, scrub, and grasslands, allowing them to live in nearly all the East Bay parks and also raise families in most of them. What they need most is plenty of open space and plenty of prey. "It takes vast areas to maintain populations and a male bobcat's home range can be 40 to 50 square miles," says Steve Bobzien, an EBRPD ecological services coordinator.

Bobcats also look for streams that can provide them with drinking water and for borders between habitat types, which are richest in prey, such as birds in riparian areas and voles in adjacent grasslands.

Bobcats spend most of their time alone, forgoing their solitary ways only to mate. Mating can happen any time of year in the Bay Area but peaks in early spring. After mating, bobcat pairs split up and the males generally don't have anything else to do with the females or with the babies they've sired.

About two months after mating, females give birth to as many as six kittens in a well-protected den. "They choose crevices that are so tight it's hard to get your hands inside, or big tangles of scrubby vegetation," Bobzien says. The dens are so well hidden that in his 20 years of studying cats in East Bay parks, he's seen only four bobcat dens—and even those just by chance. "I heard little rustlings and chirping from the kittens; that's what gave them away each time," he says. "It was super thrilling."

Newborn kittens are blind—they see the world for the first time when their eyes open at about 10 days—and helpless.



JEN JOYNT

"They're spotted, for camouflage, and are quiet when Mom leaves them," Bobzien says. Even so, they are vulnerable to raptors, coyotes, and other predators, so the mother bobcat takes the extra precaution of frequently relocating her kittens to new dens. Her devotion entails a huge amount of work, considering she may have to ferry her kittens one by one over distances that can exceed a mile.

Just as they need lots of territory to encompass a number of

safe backup den sites, mother bobcats need access to lots of food for their rapidly growing young. High densities of ground squirrels and other small animals make Sunol Regional Wilderness, Vasco Caves Regional Preserve, and Round Valley Regional Preserve among the best East Bay parks for bobcats. After nursing her kittens for a couple of months, the mother bobcat starts teaching them to hunt on their own. "She brings them not-quite-dead kills

(above) A bobcat grooms her kitten in the hills above Castro Valley. (left) Two bobcat cubs turn back to examine a hidden camera.



to practice on,” says Sunol Regional Wilderness naturalist Cat Taylor. Then, she ramps up their lessons by bringing tiny live prey like grasshoppers and mice.

The playful kittens have a lot to master in a short time because at about 10 months they start living on their own. “The parks’ vastness allows them to disperse,” Bobzien says. Dispersal keeps the population healthy by minimizing inbreeding, but is tough on young bobcats. Males have an especially hard time finding a place to live. They require large and exclusive territories, and most have already been taken and the current occupants will fight to the death to keep them. “It’s like trying to find your own apartment in New York City when you’re just out of college,”

Taylor says. Females have it easier because their territories are smaller and can overlap.

Another peril is dispersal through the urban regions. In the Bay Area the risk is especially big between parks on either side of Interstate 580 in eastern Alameda County. “I-580 is very bad for bobcats between Dublin and Tracy,” Bobzien says. “There’s almost no place for them to cross and they often get hit.”

EBRPD has been working with Caltrans and other stakeholders to find sites for wildlife corridors across I-580. “We’re identifying hot spots where a lot of bobcats and other mammals are being hit,” Bobzien says. Underpasses and overpasses for animals can be quite effective but they are also quite expensive, he notes, so “you have to make sure it’s worth it.”



..... GREAT HORNED OWL Finding a Home in Hoot Hollow

Like bobcats, great horned owls are widespread predators in East Bay parks because so many habitats suit them. “They’re very adaptable and can live in any park with tree cover,” says Anthony Fisher, a naturalist at Tilden Park, explaining that these nocturnal raptors like to spend their days in trees in quiet spots. “I fell in love with them as a child growing up in Oakland—I could look across a nearby redwood canyon and see them roosting at eye level,” he adds. Beyond trees, the owls just need lots of prey, which ranges from mice and insects to bats to and larger animals.

Also like bobcats, great horned owls are solitary except for when it’s time to have a family. But unlike bobcats, these owls are monogamous, and the fathers stick around to help protect and feed their young. They start to breed in late fall to early winter, when pairs court by calling back and forth to each other. This “duetting” is instantly recognizable as romance because while males hoot year-round, females only hoot during courtship.

Francis Mendoza remembers hearing the soft, resonant hoots of great horned owls in Coyote Hills Regional Park, where he is now a naturalist, when he was a kid. “Starting when I was 10 years old, I used to bike over and hear them hooting at sunset,” he recalls. “There were so many that the area where they nested is called Hoot Hollow.”

The owls like to lay their eggs way up high, but they normally do not make their own nests. Instead, they choose snags, rocky ledges, or large empty nests made by other birds, such as red-tailed hawks.

Nests usually have two eggs, although sometimes there can be as many as six. “Usually

Mom sits on the eggs and Dad brings her food,” Fisher says. The owlets, which peck their way through their shells after about a month, are beyond demanding. “They scream, begging for food,” Fisher says. To satisfy their brood, parents take turns hunting for mice, rabbits, skunks, and other small animals. “Great horned owls need wooded areas next to open areas with lots of prey—and that’s a park,” he says.

Young great horned owls fledge by nine weeks, at which point the adult pair starts teaching them how to feed themselves. “When their parents stop bringing food, the young start to follow them and watch them hunt,” Fisher says. Great horned owls usually hunt at night, using their exceptionally keen hearing and sharp vision to find prey in the dark. Their prey



A great horned owl mother, with her owlet and lunch.

usually don't even hear them coming, thanks to the soft, ruffled edges of the owls' feathers that allow silent flight.

Even as the fledglings learn to fend for themselves, they still hope their parents will relent and keep serving them meals. "Fledged young stay together and beg from the adults well into the fall," Fisher says. "Then the parents leave and roost elsewhere to get away." After that, the young great horned owls finally split up and start their own solitary lives.

In contrast to how it is for bobcats, dispersal is simple for the young owls. "It's easy for them to fly from park to park," Mendoza says. But it's not always safe. "They're one of the most territorial animals so it's hard to find a good place to live," Taylor says, adding that only about 60 percent of young great horned owls survive. Those that do survive float around on the fringes for a year or two, waiting for a territory to open up so they can raise families of their own.

CALIFORNIA NEWTS Synchronized Swimming.....

A newt's life is divided between two very different worlds. Hatched from eggs laid in ponds and streams during the rainy season, California newts spend their summers in sheltered spots like burrows, old pack rat nests, and rotten logs. "They're trying to stay out of the hot, dry sun," says Dave Zuckermann, the acting recreation services manager for EBPRD, who formerly worked as a supervising naturalist at Tilden Park, which is rich in newts. While

mate. Most return to the pond or stream where they were born. This can be a challenging journey—up to a mile or more—for a creature that's only five or six inches long. "The migration often comes in waves," says Zuckermann. "They're scattered throughout the watershed so some have to travel farther than others."

Males usually get an earlier start and so reach the water first. They need the extra time because, unlike females, they have to transition into their mating form. "Their tails get broader so they can swim better and they develop black roughened patches on their toes called nuptial pads for hanging on to females, which are slippery in the water," Zuckermann says.

When a female arrives, the males seem to know it instantly. Then things get wild. As many as 20 males cluster in a ball around a single female, so intent on winning her that "you can pick the ball up and they often don't even notice," Taylor says.

And for California newts, at least, love really is blind—males have mistaken Taylor's hands for female newts, clutching away in a misguided attempt at courtship. "I had no idea what was going on the first time it happened," she says. But she quickly figured out that she had recently picked up some female newts and gotten some of their seductive chemical on her hand.

Once a male newt wins a female, he hangs on to her and they swim away together. "It's very romantic," Taylor says. After mating, though, he just swims away, often in search of another female with which to mate.

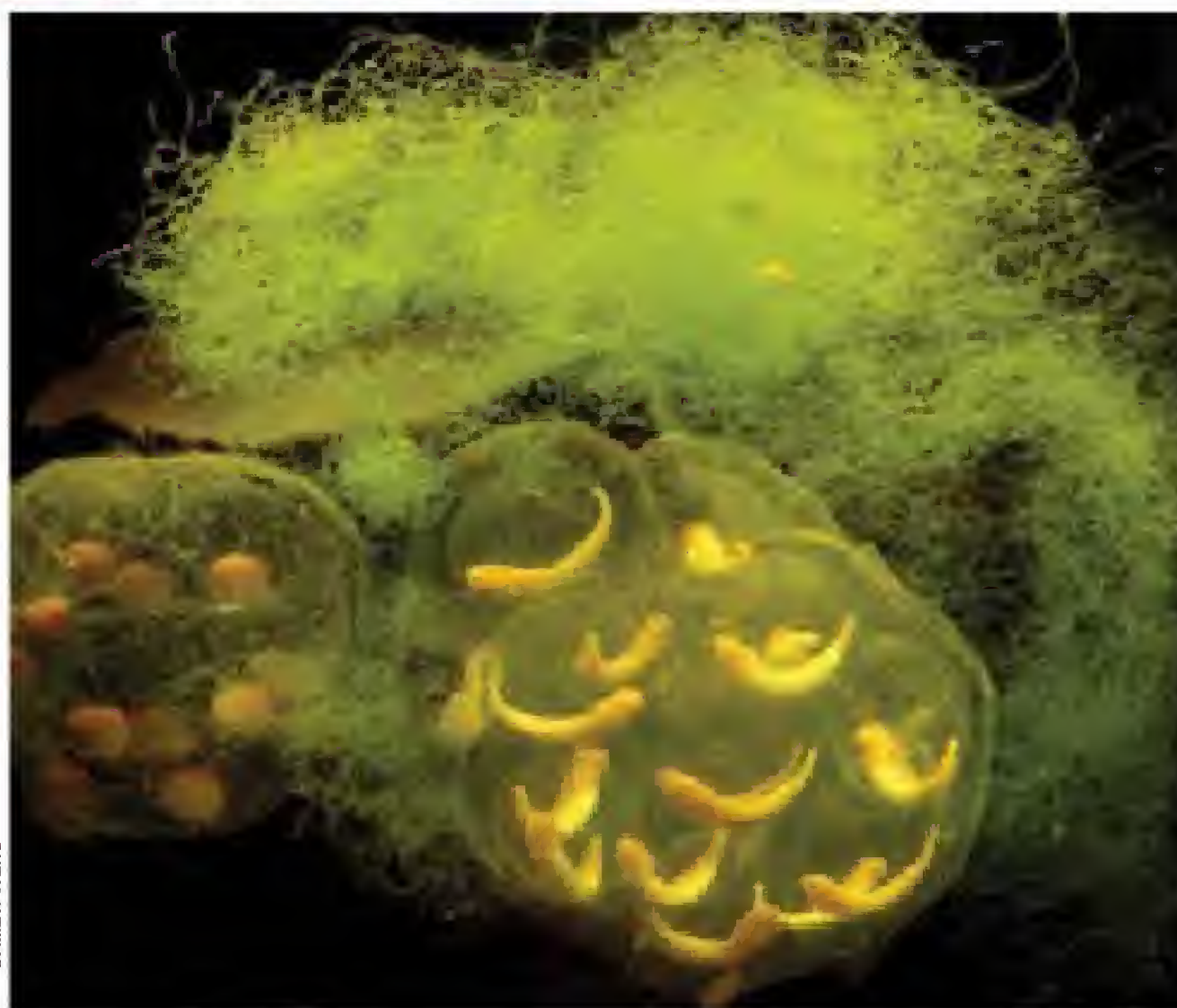
After the dance, the female newt stores the male's



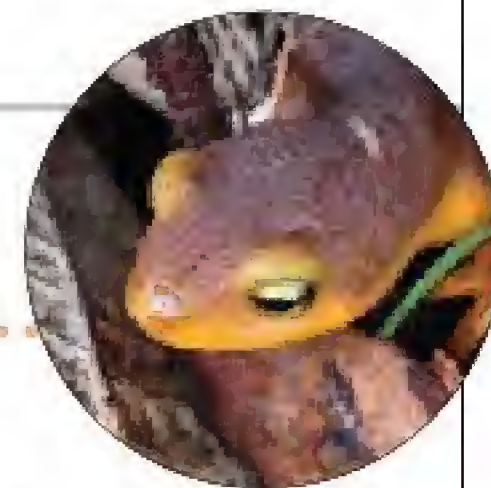
CINDA MACKINNON

conventional wisdom holds that the newts are dormant during the dry season, Taylor commonly sees them out and about on summer nights. "Newts of all sizes come out to feed at night and early in the morning, contrary to what you read in books," she says. "In fact, there can be so many of them on night hikes that you have to avoid stepping on them."

When the first rains fall newts start the trek from their upland hideouts to a nearby source of water to



DAMON TIGHE



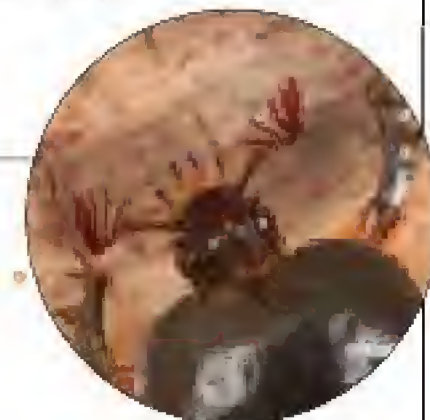
DAVE STRAUSS, DISCOMPOSITION.COM

spermatophore, and sometime later fertilizes and lays her eggs, often attaching them to underwater stems or roots. “She holds on with all four feet and slowly extrudes her egg mass,” Zuckermann says. “She may lay several egg masses—hundreds of eggs altogether—with the hope that some will reach adulthood.” But this is as far as her parental duties go; afterward she just swims away too, returning to her summer home.

In two to three weeks the newt eggs hatch. “The larvae are beautiful silvery creatures,” Zuckermann says. “They’re almost invisible in the water.” That helps protect them from predators, which is important as they haven’t yet developed

their characteristic poisonous skin. Even adults of their own kind will eat them at this early stage. Larval newts eat tiny aquatic insects and other invertebrates, while adults eat anything they can catch, from worms and slugs to insects and spiders.

After they metamorphose into their adult form, developing the lungs they need to live on the land, young newts leave the water. “They’re the most beautiful, delicate creatures, about an inch long, miniatures of adults,” Zuckermann says. The final step is dispersal to their upland habitats, where those that make it spend the dry season growing up.



RAIN BEETLE Race to Mate

Like newts, the rain beetle has a breeding season triggered by the first fall rains. Ancient members of the scarab family, rain beetles are about an inch across, with glossy dark backs and fuzzy orange bellies. Unlike the newts, rain beetles are rarely seen. They spend most of their lives—up to 13 years!—deep in the soil as larvae, munching on roots. It’s a good thing the grubs spend so much time eating, because the short-lived adults don’t get to eat at all. They don’t even have working mouthparts.

After pupating into their adult form in late summer, the beetles hang out underground and wait for a soaking rain to get the soil around them wet. Then they dig their way to the surface, using their strong legs and the small but sturdy scoop on the front of their heads. “They’re little digging machines,” says Tilden Park naturalist Fisher. “They’re not fast but they work hard.”

Only the males fly and when they do, they’re in a rush to find females because their fat stores are only enough to fuel a couple

After years underground, an adult rain beetle makes a rare—and short-lived—appearance in the East Bay Hills.

of hours on the wing. They’re also racing to mate before they fall prey to the many animals that feast on them. “Coyote, fox, skunk, raccoon, and others dig up and chase the hapless beetles, leaving fascinating stories in the form of paw prints in the muddy trails,” Fisher says. “A day or so later, we’ll find the scat of these animals, filled with rain beetle remains, at trail junctions.”

Females stay in or near the burrows they’ve dug to reach the surface, attracting males with alluringly scented molecules. “Males fly low and fan out their antennae, which look like little antlers, to increase the surface area for detecting pheromones,” Fisher says. After mating, females crawl back into the ground, digging as far as 10 feet down and laying their eggs in a spiral at the very end of the burrow before dying. The grubs hatch about two months later, beginning the long, strange rain beetle life cycle all over again.

Because neither the grubs nor adults can get very far, rain beetles need relatively undisturbed land to dig in. “If you dig up an orchard, you could wipe out a population,” Fisher says. “They need protected open space.”

Which brings us back to the one thing that people, bobcats, great horned owls, California newts, and rain beetles share: we all need protected open space. We need it for different reasons, but our healthy relationship to the land benefits from the land being many things to many species. We are fortunate here to have contiguous, connected open areas, and we are fortunate to be able to share them. And what might be the most visible highlights for us—those rolling green hills, bursting wildflowers, and spreading oaks—have no less charm for the success of the rich world beyond our sight. 🐞

Robin Meadows is a Fairfield-based science writer. She enjoys spotting quail, great horned owls, and gray foxes in her own backyard, next to Rockville Hills Regional Park. Her children are all grown up but they still enjoy family bikes in the Bay Area and beyond.



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BY ARIEL RUBISSOW OKAMOTO

FLOOD CONTROL 2.0

*Looking to the zone where creeks
meet the Bay to guide our response
to extreme storms and sea level rise*

“Climate Change: Dispatches from the Home Front” is a series of articles highlighting groundbreaking work being done by Bay Area institutions, agencies, and nonprofit groups to comprehend, mitigate, and adapt to the impact of climate change on Bay Area ecosystems. The series is a partnership with the Bay Area Ecosystem Climate Change Consortium (baeccc.org). More at baynature.org/climate-change.

It was the kind of January day where you couldn't see your breath but the baylands were steaming. Puffs of smoke garlanded the spires of bordering oil refineries. Blue skies, green hills, white windmills, and three bridges marked the corner of my eye. ¶ With so much to look at, it was hard to focus on the precise place here along the Contra Costa County shoreline east of Martinez where 12-mile-long Walnut Creek empties into Suisun Bay.

That day the moon intervened on my behalf—conjuring a king tide that flooded

the low wide channel with so much water that the creek mouth emerged in plain sight. The scene even proffered the bark of sea lions from a channel buoy, a passing ship, and a raptor.

Spreading its black-tipped wings, this muscular harrier flew a wavy line across a run-down marsh as he scouted for snacks.

The sight reminded me that wildlife doesn't have to be in a

wilderness to thrive. Everything about this landscape has the makings of the kind of resilience our former creek mouths may offer as we reconstruct our shores to adapt to rising sea levels.

More than 200 creeks once flowed toward the Bay—either cutting a direct channel to the shore, or melding into a marsh slough, or spreading into a moist meadow before percolating into the groundwater basin, among many pathways. Today, however, most of these creeks aren't allowed to follow their nature. Farmers dug them into ditches and erased them from their fields; salt-makers rerouted them around their bayshore production ponds; and growing towns confined them to culverts, tunnels, and channels. Nobody likes to find their property swamped after a storm.

By the mid-1900s, the big alterations were being made by the U.S. Army Corps of Engineers and the small ones by local public works departments and flood control districts. Engineers often designed these systems to accommodate the kinds of floods that occur once every 100 years. But then along came climate change and the prospect of “100-year” floods occurring much more frequently. And along with that came fears of flooding threatening us from both above and below—as the first flush of storms surging down creeks might meet the higher tides of a rising Bay in the lower elevations of many a Bay Area town.

“In 2006, we had a flood that was so bad that in order to protect downtown Novato we were put in the position of having to breach a levee or the levee was going to breach itself,” says

Liz Lewis, watershed planner for the Marin County Department of Public Works. The situation forced the county to move a little faster than planned with some ideas it was already considering for the future. “We breached the levee, diverted some flows into a basin, and let 1,200 acres of our property flood, and the floodwaters downtown receded. It was a ‘wow’ moment. We started to see

how opportunities watershed-wide really needed to be pulled together so we would have a strategy not just to protect us from storms like 2006, but also from sea level rise.”

Pulling it all together is one of the goals of Flood Control 2.0, a planning partnership of the San Francisco Estuary Partnership, the San Francisco Estuary Institute (SFEI), the



COURTESY WALNUT CREEK HISTORICAL SOCIETY

Flooding submerged streets in downtown Walnut Creek in 1958, part of a series of major floods that led the Army Corps of Engineers to channelize and wall off the creek in the 1960s.

San Francisco Bay Joint Venture, and the Bay Conservation and Development Commission (BCDC). Novato and Walnut Creek are two of the project's natural laboratories for experimentation. Maybe there's a way for flood control to be less rigid and more flexible. Maybe the way California creeks used to behave naturally could teach us a thing or two.

“We have some pretty progressive flood control agencies around the Bay who have heard from their local citizenry that they would like to see the next generation of flood protection

projects be more green and support more fish and birds and marshes,” says Robin Grossinger, an historical ecologist with SFEI who heads up Flood Control 2.0’s science team. “The truth is, creek mouths are a critical part of the Bay edge that have been incredibly neglected and incredibly modified. Restoring them offers a whole new frontier for ecological resilience.”

I asked around about whether there were any good examples left of a natural creek mouth on the shores of San Francisco Bay. Nobody seemed to have an answer. But we have a rough idea of how they behaved in the past. SFEI geomorphologist Scott Dusterhoff, who led the development of an online tool for comparing historic to present-day creeks for Flood Control 2.0, says his team noticed two “illuminating things right off the bat.” First, a lot of creeks were just plain gone. Second, many of the creeks that did not historically connect to the Bay, except during the biggest flow events, now have a permanent connection—courtesy of human intervention.

Where creeks did reach the Bay, says Grossinger, they once had “little mini-deltas or estuaries with more sediment coming out of the watershed, more freshwater influence, and a more complex interface with terrestrial and riparian habitats, than what we see today.” Flood Control 2.0 would like to rework some of this natural adaptability into the areas around former creek mouths.

WALNUT CREEK

Walnut Creek flows out of the west side of Mount Diablo, picking up water from a number of medium-size tributaries as it streams north through the towns of Concord and Walnut Creek and then meets up with Pacheco Creek before flowing out into Suisun Bay. In the mid-1900s farmers wanted the creek’s floodplain for farming, and they gradually started to turn its lower reaches into more predictable channels. After major floods in the 1950s and 1960s inundated the growing towns around the creek, the Army Corps took over, widening and deepening the lower channel and rimming it with walls.

Eventually however, sediment piled up in the channel, making it less effective for flood control but friendlier to plants and animals that rely on riparian and floodplain habitat. The Army Corps removed 850,000 cubic yards of sediment in 1973, but by the 1990s it was back again and so was the muddy habitat. The corps said that the sediment (and the habitat) had to go.

“From a geeky engineering standpoint, the channel had already come into equilibrium in terms of sediment balance. If we had removed it, I was worried it might throw the creek out of balance and it would take decades to get the habitat back,” says engineer Paul Detjens, who started his career at the corps but has worked for the Contra Costa County Flood Control

NATIONAL AGRICULTURAL IMAGERY PROGRAM (USDA); COURTESY SAN FRANCISCO ESTUARY INSTITUTE



Aerial photo shows the channelization and industrial surroundings of lower Walnut Creek. Adjacent to the creek mouth to the east is the Tesoro refinery wastewater treatment pond. Beyond that are the wetlands of the Point Edith Wildlife Area. Pacheco Marsh is to the west of the mouth.

District for more than 20 years.

Initially, instead of more dredging, Contra Costa partnered with the corps on restoration planning but that process foundered. “We were stuck with a corps partner that lacked funds to finish planning but still demanded we remove sediment so the channel could look like the one they built in 1965,” Detjens says. Finally, in 2014, with the help of Congressman Mike Thompson, Contra Costa succeeded in doing something fairly unheard of—removing a flood control channel from federal control. As a result, the district will no longer have to dredge sediment from the lower four miles of the watershed, and will instead have a natural supply of the precious material for restoration around the mouth of the creek.

Looking over the scene where Walnut Creek flows into the Bay, one can readily see how Detjens hopes to recover a lot in this potentially dynamic zone. Amid the sewage pipeline risers, fenced-off landfills, and Homeland Security–patrolled refinery perimeters, he points out where there’s wiggle room to spill into

old floodplains, widen the west side of the flood control channel, and improve adjacent Pacheco Marsh. And while he's at it, he'd also like to provide a couple of points of public access to an otherwise private shoreline.

First steps will be an analysis of what elements of the built landscape—roads, refinery environs, bridges, sewage lines, industrial yards—could be at risk from flooding and sea level rise. The analysis will be carried out by the BCD's Adapting to Rising Tides team. After that, Flood Control 2.0's science and design team will collaborate with the flood control district and the community at large on a new plan. "Our district represents the next generation in flood management. We've turned a corner, and we now have a much more sustainable mindset of working with nature," says Detjens.

NOVATO CREEK

According to a review of old maps, descriptions, and photographs, Novato Creek once drained into a mosaic of estuarine habitats encompassing more than 8,000 acres. Habitats within this zone included a big band of tidal marsh, 98 miles of tidal channels and sloughs, and over 20 miles of the kind of transition zones between water and land so necessary for habitats and creatures to adapt to high tides and higher seas. But when humans confined the creek between levees and turned adjacent baylands into farm fields, the creek mouth lost more than 80 percent of this estuarine habitat, including its marshes, channels, and transition zones. Sediment started clogging the main channel, resulting in the need to dredge 30,000 to 50,000 cubic

yards every four years, while the drained baylands lost their sponginess and sank three to four feet below sea level.

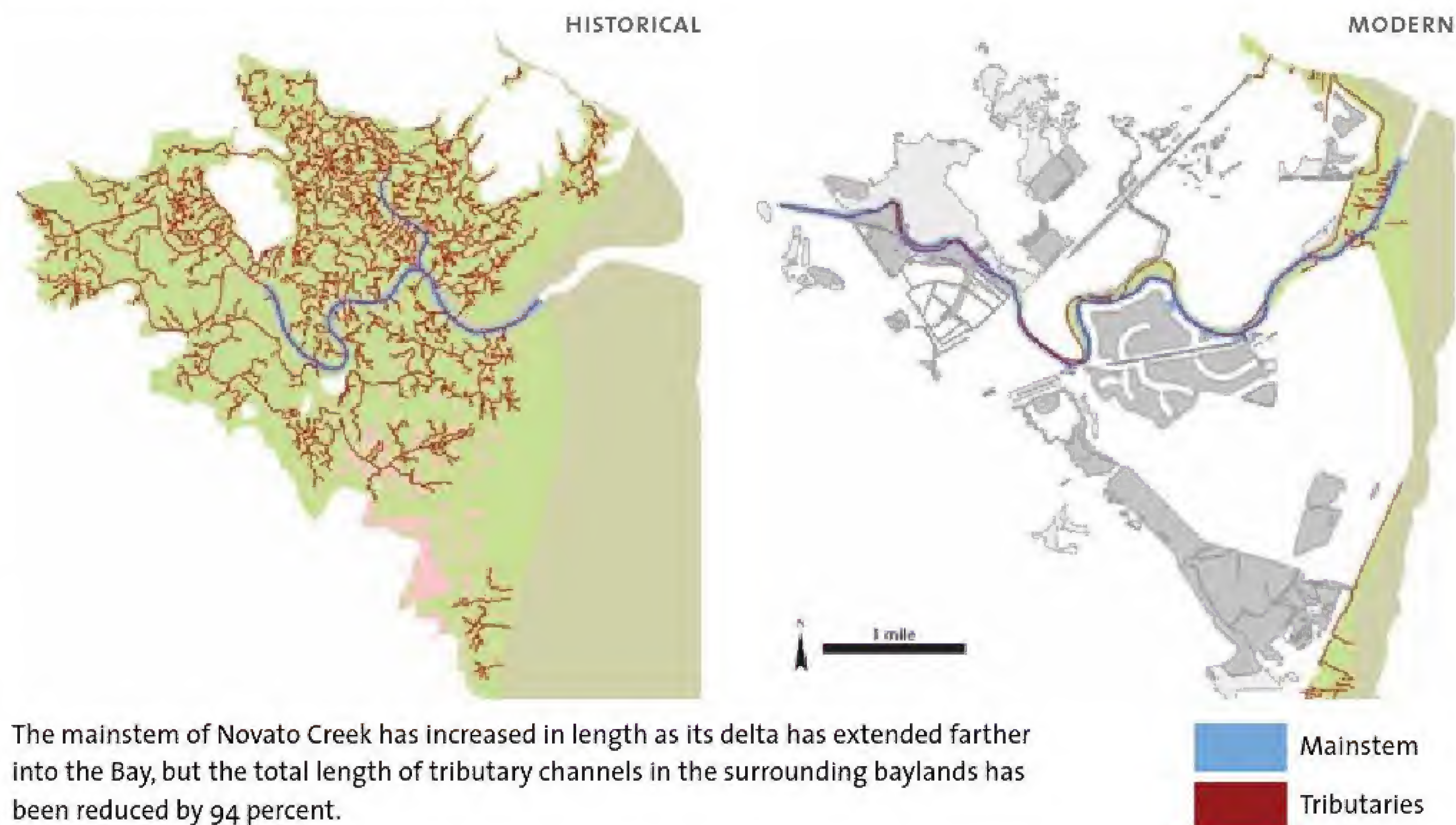
By the time the 2006 flood came along, Marin County had already increased the capacity of an upstream reservoir and feeder creeks and was well on the way to reevaluating its flood control infrastructure with habitat and sea level rise in mind, via its Novato Watershed Program. Communities along the creek were very supportive. And Novato's flood control district had one big rabbit up its sleeve that few others could conjure: 1,200 acres of its own land.

"We have this huge blank slate to work with, which is unique in the Bay Area," says planner Liz Lewis. "It's one of the reasons Flood Control 2.0 represented such a great opportunity for us when it came along in 2012. It was the perfect time to support and enhance our planning process."

Through a couple of design workshops bringing together local flood control engineers and the expert regional science team coordinated by SFEI, the group has now penciled out a long-term vision for the lower reach of Novato Creek and identified high-priority areas for making it more adaptable to sea level rise. In one area north of Highway 37 and west of Highway 101, for example, the plan proposes to redirect fine sediment clogging the upper creek channel onto the marshes via slurry. Adding this layer will help the marsh plain rise in elevation, in keeping with the rising level of the Bay.

Another idea is to reuse highly treated wastewater from a local sanitary treatment plant to irrigate plantings on the side of a new kind of "horizontal" levee, akin to using a treatment

HISTORICAL AND MODERN NOVATO CREEK



The mainstem of Novato Creek has increased in length as its delta has extended farther into the Bay, but the total length of tributary channels in the surrounding baylands has been reduced by 94 percent.

wetland instead of discharging wastewater to the Bay. In an ongoing drought tapping treated wastewater for restoration irrigation seems like a no-brainer. Meanwhile, the new levee, built a little wider to provide habitat for animals seeking refuge from high tides, could protect infrastructure, help endangered species, and treat nutrients in the wastewater. Novato residents will get a chance to hear about this vision in a public workshop this spring.

"It's a pretty cool collaboration," Grossinger says. "It's a lot to ask local agencies to think in terms of Bay habitats as a whole."

The vision proposes to reconnect the creek to the adjacent marsh and recreate historic salt pans favored by several bird species. It even suggests in-your-wildest-wetland-dreams items like a flow-through causeway for Highway 37. If Bay tides could spread farther west into former marshlands, for example, by passing under the highway, it might relieve some of the flooding pressure in northern Marin.

"Flood Control 2.0 is not advocating over-engineering of these landscapes," says Dusterhoff. "In the areas where Marin County has the potential of getting land next to the creek, that's where we call for taking down levees and letting tidal action come back in. In other areas, where we know Marin County can't change the flood control infrastructure because it protects development and transportation corridors, that's where we proposed the horizontal levee."

Walnut Creek isn't as far along in the Flood Control 2.0 planning process as Novato Creek, but enthusiasm for the possibilities among planners and the local citizenry is already equally palpable.

Local photographer Steve Hutchcraft has visited the nation's greatest wildlife refuges and thinks Walnut Creek's shoreline zone could be a "world-class" addition to their ranks. "The combo of salt marsh and creek mouth means the area now hosts one of the most elusive bird species in the country, the black rail," he says, recalling a visit to the site when a biologist broadcast this tiny red-eyed bird's call and got three birds to call back within five minutes. "They're very territorial," he says.

Hutchcraft is also on the board of the Muir Heritage Land Trust, a nonprofit involved in efforts to improve the ecology of Pacheco Marsh on the banks of the Walnut Creek flood control channel. On a recent tour with elected and local officials, he emphasized that birding is a \$41 billion industry, according to the U.S. Fish and Wildlife Service, and that Pacheco is the perfect place to enjoy it.

"There's low spots and high spots, lots of waterfowl during migrations, raptors and owls, song sparrows and yellowthroats," he says. "The lighting is really good; nothing blocks the views. You've got the sun coming up over the Delta and setting over the Carquinez Strait. Opportunities for photography and nature study abound." And so, it would seem, do opportunities for something as seemingly mundane as flood control. 🐦



An artist's rendering depicts the potential future for lower Walnut Creek as a recreation and wildlife hub, following the implementation of Flood Control 2.0.

Ariel Rubissow Okamoto is the editor of Estuary News, the quarterly journal of the San Francisco Estuary Partnership. She is also co-author of Natural History of San Francisco Bay (UC Press, 2011) and a frequent contributor to Bay Nature.

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Environmental Education Award: Julia Clothier

Interview by Jacoba Charles

Bay Nature's Local Hero Awards are awarded annually to three individuals selected by the board and staff of Bay Nature for their outstanding work on behalf of the natural world of the San Francisco Bay Area. The 2015 awards were presented to the people who appear on the following pages at Bay Nature's annual Local Hero Awards dinner on Sunday, March 22.

Julia Clothier has been working with nature since she was in her teens. For the last six years she's been the director of the Clem Miller Environmental Education Center at Point Reyes National Seashore, providing place-based environmental education programs to kids from around the Bay Area. I met Julia in her clean, white-walled office inside the old farmhouse that now serves as the center's headquarters. Along one wall a packed bookshelf is topped with a small altar of stones, feathers, and photographs. And there's a view outside the window of a green meadow and mist-wreathed Douglas fir trees.

BAY NATURE: Let's start at the beginning: Where did you grow up?

JULIA CLOTHIER: I'm still working on that! But I spent my childhood in Palos Verdes on the Southern California coast. It's a peninsula just south of Los Angeles. Catalina Island is across the channel. Southern California had around 8 million people when I was growing up, so it was nice to be able to stand on the beach and see open space when I looked west.

BN: What kinds of experiences with nature did you have as a kid?

JC: I didn't grow up in a household with any environmental consciousness at all; my parents were both conservative Republicans. We had a very nice house in a very nice town, and didn't have a lot of awareness about what was going in the world ecologically or socially—it just wasn't in the zeitgeist of my family.

But my dad was a sailor, so that was my "in" to nature. I learned to swim

in the ocean and I got to sail my whole childhood. My middle school and high school were both on the cliffs overlooking the ocean, and my biology classes were outdoors a lot. I went to summer camp in the mountains or on Catalina Island. So that forged my early connection to nature.

BN: When and how did you start on your environmental career path?

JC: I started reading environmental literature and worked at some summer camps in my late teens. Then I went away to college for a little while. My parents had split up unexpectedly just a couple of months before I graduated from high school, and it really knocked me off balance. But in retrospect it was the making of me: I had an absolutely clean slate to work from.

I realized pretty quickly that I didn't want to be in college, and I got a job working at Canyonlands National Park. I just jumped in the deep end. There I was, a Southern California beach girl, and I

packed up my Toyota and drove to Utah in February. I ended up in the Needles District, and when I got out of the car it was so quiet I could hear my ears ring.

I spent the next six months in the Red Rock desert doing backcountry patrols, giving campfire programs, writing backcountry permits, and doing my very first backpacking trips. And I read Edward Abbey, Henry David Thoreau, John Muir, and Wallace Stegner. Later I went to the North Cascades for a seasonal job; I got to spend the summer in a

fire lookout when I was only 23! I was flown by helicopter to the top of a mountain, where I lived by myself for a whole summer. It was wonderful. It was the same mountaintop where Jack Kerouac had worked as a fire lookout. It was a formative experience.

By then I was pretty clear that I was profoundly connected to the natural world and that my work was to help people reconnect. I went back to college and got my undergraduate degree in botany and then my master's in natural history and my special area was ethnobotany.

I got a series of jobs as a naturalist in outdoor schools across California; I worked in the Sierra, the redwoods, and on the coast. During that time I worked at the Point Reyes summer camp. In fact, my first environmental education job was as a counselor intern naturalist here at Point Reyes.

Then I taught biology at Santa Rosa Junior College and Sonoma State for a couple of years, which was interesting. Working with college students is rewarding but my preference was to be outside more. And now I have one of those jobs where I mostly sit in front of the computer!

BN: Tell us about the programs you run now.

JC: During the school year we host about 1,800 kids and at least half of those are from the most underserved neighborhoods in the Bay Area. We provide full-immersion science, environmental, and human history programs.

Some of these children have never been anywhere like Point Reyes before. We have a pretty big scholarship program, including for recently arrived refugees and urban Native American kids whose ancestors lived on this land and still consider this their ancestral home. In order to bring their (continued on page 53)



DANIEL DIETRICH, POINTREYESSEAPARIS.COM

Conservation Action Award: Ralph Benson

Interview by Brendan Bubler

Ralph Benson recently retired as the executive director of the Sonoma Land Trust, a position he held for the last dozen years, working to preserve important natural and agricultural landscapes in one of California's most ecologically diverse counties. Before that, Benson spent nearly a quarter century working at the Trust for Public Land (TPL), where he helped that national conservation organization preserve such iconic places as the neighborhood around the birthplace of Martin Luther King, Jr. and the woods around Walden Pond. An Ohio transplant by way of New Jersey, Benson arrived in the Bay Area at the age of 10 when his father was hired to be the director of the San Francisco Boy Scouts' Camp Royaneh, along Austin Creek in Cazadero in western Sonoma, where Ralph spent his summers.

BAY NATURE: What kinds of experiences in nature did you have as a kid?

RALPH BENSON: I grew up on the Peninsula in the '50s when you could wander around and there were creeks and vacant lots and things like that—places to play. I think I just liked to goof around. My favorite thing was the horses we had at the camp. People didn't worry as much about liability issues in those days. My job was taking care of the horses and leading trail rides and wagon rides. My teenage years were spent hiking and riding around western Sonoma County on horses and I think that's where I connected with the outdoors.

BN: How and when did you get involved in environmental work?

RB: I gravitated toward land use law when I was in law school at UC Berkeley in the late '60s. There was a lot going on. There was Earth Day, and the environmental movement was just getting going. I was drawn to that. Save the Bay was just getting under way, and I remember following that when I was in law school. My first job after law school was working in the Orange County counsel's office on land use for the county planning commission, when it was the fastest developing county in the state.

BN: What did you start out doing at the Trust for Public Land?

RB: I was general counsel. Back then, I was the only lawyer in the organization. We started growing and opening offices around the country. I think by the time I

left we had over 20 lawyers, 25 lawyers. I migrated into management.

BN: What were some big projects you were involved in at TPL?

RB: It was a national organization, so we bought some land around Walden Pond in Massachusetts. And there was an urban land program. TPL was one of the first organizations to focus on community gardens and urban land, making the case that there's a continuum from the inner cities to the wilderness areas. Probably the most fun was working in Atlanta, in the neighborhood of Martin Luther King's birth home. The King home had been preserved but the neighborhood was really falling apart. So TPL went in and we quietly bought a number of properties on Auburn Street and then subsequently gave them to the National Park Service. Now it's one of the most visited national parks and a lot of that was TPL going in early and buying the land. I worked with a guy in our New York office on that.

One of the other things that I am proud of is the role that TPL played in the development of the land trust movement. Huey Johnson, who started TPL, was a real visionary. He hired a woman named Jennie Gerard to direct a program to help communities in the West start land trusts. MALT, the Marin Agricultural Land Trust, and the Sonoma Land Trust

were assisted in the early days by TPL's land trust program, as were the Napa Land Trust and many others.

BN: What's special to you about Sonoma County?

RB: The landscape, the variety, the beauty. The redwoods, the ocean, the Bay breeze—the smell of it—and the Sonoma Valley. It's also kind of magical that it's part of this major metropolitan area. Everything's here. Rich culture, natural beauty, the wine—what's not to like? It's a cliché, but we live in paradise. There's also humane politics ... I mean, I like our politicians. You don't find that everywhere.

BN: What are some of the major challenges trying to protect land in Sonoma?

RB: Funding is always at the top of the list. Land is expensive here. That's why all the projects are collaborations and partnerships. It takes pulling the community together. But it's a very conge-



nial and collaborative county. Climate change is going to be the big challenge. It moves slowly but there's no question that it's happening.

BN: Is the land trust's Baylands project an example of how to address that challenge?

RB: Yes. Our Sears Point project will bring back a thousand acres of marshes on the northern edge of San Pablo Bay and serve as a kind of buffer for sea level rise. We got most of the construction done this past year. Some remains, including the construction of several miles of the Bay Trail. Sometime later in 2015, we'll be able to breach the outer levee and then gravity and nature (continued on page 54)

Youth Engagement Award: Javier Ochoa Reyes

Interview by Jennifer Baires

At 16, Javier Ochoa Reyes left his family, and the small village in Mexico where he lived, to go to school and find work in the United States so he could expand his horizons and help his family. He settled in Richmond and worked several jobs while he went to high school. Through involvement with several program for teens in Richmond he discovered a passion for helping youth, and the environment, which led eventually to his work with Groundwork Richmond. At Groundwork Reyes teaches high school-age youth about the importance of trees in urban environments, and works with the students to create more green spaces in Richmond, including stewardship of segments of the Richmond Greenway. At the same time, he is pursuing a degree in civil engineering at Contra Costa College.

BAY NATURE: You were born in San Pablo here in the Bay Area but you grew up in La Esperanza in Mexico. What was it like there?

JAVIER OCHOA REYES: It was a rustic place. It isn't a city; it's a small village. I was working in agriculture and going to school at the same time. We worked a lot, planting corn and strawberries.

BN: How old were you when you started working?

JOR: I think five years old. We'd also fish and go to the mountains nearby to hunt for food.

BN: It doesn't sound like there was much time to play or explore.

JOR: There was not a lot of playing outside. Not because my parents didn't want me to, but more because I felt bad playing when I knew we needed to work. I come from a really poor ranch

and a really poor family. There were times when we didn't have money to buy anything to eat. It was hard. We were nearly starving and that's why I decided to come back here by myself.

BN: How did you end up in Richmond?

JOR: I wanted to find a job and help my family. I was born in San Pablo and a few of my uncles were here, so I moved in with one of them and started working.

BN: What were the first few days and weeks like for you?

JOR: They were terrible. They were really sad. I felt like I was on another planet. I felt restricted about going out at night because I was living in a more dangerous area. I didn't really know my uncles because they'd lived here all my life. So I

was really close to going back to Mexico, but the educational opportunities here, and work, were really good. I got a job within a couple of weeks and decided to stay and start school.

BN: Did you speak English when you came here?

JOR: No. Not even a word.

BN: What did your day look like in high school?

JOR: I would go to school from 7:00 to 3:00, or 3:30, and then go to work at 4:00. Then from 4:00 to 9:00 I'd work, and then I had another job cleaning stores until early the next morning. Sometimes I would just take a shower and then go to school.

BN: Wow. When would you sleep?

JOR: Sometimes I wouldn't sleep for one or two days. It was intense.

BN: How did you come to environmental work?

JOR: After I graduated from Richmond High I was taking pre-calculus and chemistry at Contra Costa College and applied for a science tutor position with the city of Richmond, for its Straight Talk On Prison tutoring program that helps at risk-youth stay out of jail through education. While I was tutoring there we partnered with Groundwork Richmond on some volunteer projects.

After about a year the executive director at Groundwork saw how hard I was working and my ability to talk to and motivate the kids. They told me I was a role model for the kids and offered me a project coordinator job. By then, I basically had the experience required; I knew all of their projects and how to do them.

BN: What about the work with Groundwork do you like?

JOR: Richmond is a city with a lot of contamination; I like the fact that we do stuff to help, like planting trees, cleaning parks, and helping the environment. And I love to work with the kids.

BN: Can you tell me about the Greenway Project you've been working on?

JOR: The Greenway is 3.5-mile bicycle and pedestrian path that passes through the heart of Richmond. We have two sites on the Greenway we're responsible for keeping free of garbage. Our long-term plan for those sites is to build a park on each one. But *(continued on page 54)*



JENNIFER BAIRE

(CLOTHIER continued from page 50) classes, teachers first have to go through a 20-hour environmental education and natural history course. Instead of getting a prepackaged program, the teachers are trained to run their own programs and teach their own students. The idea was that the learning would go deeper, the teachers would have more ownership, and that it would flow into the school and the community. And that's what's happening.

It's a lot of work—60-, 70-, 80-hour weeks—but I love it. I go to a lot of meetings and I talk on the phone a lot. But for two months every year I get to be down at the environmental education center running our nature science camp and adventure camp programs. I don't know too many people at this point in their career who get to be in the field for two months.

BN: *What sort of changes do you see in the kids during their time at Clem Miller?*

JC: When they first get here, a lot of them are nervous and afraid. They're worried they might get lost; there might be a homicidal maniac around the corner; they might get dirty; or there might be an animal that's going to hurt them. There's no Internet or cell phone connectivity. But after a few days they're relaxed in their bodies, they're calm, and they don't want to go home.

For a lot of the children, five to six days at Point Reyes is the best time in the whole year. It changes their idea of what their life could be and what's important. There's this sense of, "Oh my gosh, I knew there was more." It's profoundly reassuring. It's validating for them to realize there are some people they share some core values with.

And then those teachers and our partners in community-based organizations recruit applicants for our summer camp scholarship program. So many of the youth who first come here with the school program fall in love with the Clem Miller Center, and being outside—and then they apply for a scholarship to our longer summer program.

And now some of the children who've been coming every year are aging out of our camp program, becoming counselors in training, and joining our staff. So first

the camper community became more diverse, and now our staffer community is also becoming more diverse.

The more diverse the staff becomes, the more comfortable the youth who show up are going to be; the more diverse we are, the better we can reflect back the diversity of the community of children. Really, we have to make sure everyone is on the same page when it comes to ecological sustainability and social and environmental justice. There's no room for a color line there.

BN: *How do you get through the resistance of the kids who are afraid or say they're not interested?*

JC: During the school year, the children are here with their teachers, parent chaperones, and friends from class. Familiarity, safety, and respect go a long way to helping them stretch their comfort zone if the natural world is unfamiliar to them or they're feeling frightened.

For the summer program, we highly discourage parents from sending children who don't want to come, and if somebody is totally averse to being there we send them home. We don't keep people here against their will.

I'm trained in nonviolent communication, and my entire staff gets this training. The basic premise is that every single person is in charge of her own dignity and has rights, and we don't impose our will. We talk with our summer camp staff about weaving the basket really tight, so every single child knows they're cared about, they're safe, they have choice, their opinion matters, and their dignity is respected.

BN: *What are the obstacles to getting more kids into nature education programs like yours?*

JC: Nature education is seen as an extra. We need a values shift. Actually, what we need is tough and honest acknowledgment of the importance of healthy natural systems in our lives. But we live in climate-controlled homes and get in climate-controlled cars and go to climate-controlled schools and work in climate-controlled offices and shop in climate-controlled stores, and we have electric lights and heaters and air conditioners. The hard reality of the natural world, and our need for it to function in some sort of stable way, is very theo-

retical—for all of us. The problem with the environmental crisis is that it's taking too dang long!

BN: *How has working with kids informed how you experience the natural world?*

JC: Children are generally way more present in their bodies and current with their emotions, and less in their intellect. They are less lost in the catacombs of their thought. They are also way quicker to laugh and play and improvise. It seems like children are much more in touch with their authenticity, creativity, and life force than adults are. So when I'm with children I also get to be much more in that place myself.

When I taught college and I'd give a lecture on why do environmental work, I would say, "Imagine that you come upon a horrible accident: What should you do in that situation? You might call 911, or run around screaming, or drive away, or decide you need a drink. Or you might roll up your sleeves and see how you can help." I feel like that's what we're being called to do. You can't focus on the big picture—it's too overwhelming and often too depressing—but we can roll up our sleeves and go find a thing to do. And that's what I've been doing in my career. I don't know if it's going to make a difference in the big picture, but it's what I need to do for me. It gives my life meaning.

BN: *Are there particular animals or plants that fascinate your students the most?*

JC: I don't think so. Children have varied interests, so we expose them to lots of choices. Some want to hold a banana slug, and some don't. We have a camp gopher snake named Rex, and some don't even want to be in the same room while some want to hold Rex every day. There are two things that are universally interesting to children. They're fascinated by dead animals, maybe because we don't see much death in our everyday lives. And they're also fascinated by scat, animal poop. And there's a bobcat that lives in the back meadow, so the kids are pretty darn excited to see that. And they like the seals that poke their heads up and watch us at Limantour Beach.

BN: *Do you have a favorite place to go when you're not "on duty"?* (continued on page 54)

(CLOTHIER continued from page 53)

JC: Weirdly, I don't go hiking in Point Reyes, because I want to be in places where there aren't any other people. That's what I seek out when I have time. My favorite wild places are where I'm not going to run into another human soul. There are high Sierra

canyons and hidden coves on the Northern California coast that I love. Notice that I didn't mention any specific places! I think there's a special place in purgatory for people who write articles in *Outside* magazine that are like, "Best secret canyons in southeastern Utah that no one knows about." 🐦

(BENSON continued from page 51) will take their course and over 20 years the marsh will return. . . . Something will eventually have to be done about Highway 37. It's already underwater during certain high tides. The solution will probably be something like the Yolo Causeway for I-80 west of Sacramento. That way you can protect the wetlands too.

BN: What's your favorite piece of land that you protected at the Sonoma Land Trust?

RB: No favorite. It's like your children; you love them all. I like the variety. I'm always entranced when I'm at Sears Point. Also, I've been staying in Glen Ellen at the land trust's Glen Oaks ranch. Walking through the oak woodlands is about as nice as it gets. We have these seasons. Out at the ranch, all summer it was so dry and so brown, and then we had these rains and it was like someone flipped a switch and everything turned green.

BN: Are there any areas of Sonoma that you'd highlight as critical to preserve in the future?

RB: The most important thing is to tie together large landscapes and to make the connections so there aren't kind of isolated areas but instead broad swaths of protected land.

I think the urban growth boundaries are vital and therefore protecting the land at the edges and the margins is important. I think there's a lot more room for development in Sonoma County, actually, if the urban areas can continue to urbanize. Petaluma is a good example; so is Santa Rosa. They can accommodate more, if people are willing to create more urban environments. That's what it will take to protect the open spaces.

BN: How do you balance the goals of preservation, stewardship, and access to protected open space?

RB: There is a tension. I have a personal bias for public access but recognize there are real constraints. If people want

working ranches and working forests, there are going to be some restrictions on access. It's just something that has to be managed. When the land trust buys land we're holding it in trust for the public. But then on the coast, you could buy some land, open it up to the public, and watch all the abalone get poached to extinction. So I don't know. It's complex.

BN: How do you convince people of the value of saving land?

RB: It doesn't take much convincing around here. When Measure F, which reauthorized a sales tax for our Open Space District, was on the ballot some years ago it passed with a 76 percent "yes" vote—that was for a tax! Land protection is really consistent with community values here. People, either they've been here and feel a connection to the landscape or they moved here because of it. The land is a real driver of the economy. Its beauty is part of what the wine industry is selling. It's why people visit. It's why people buy second homes here.

But our kids: How can they afford to live here? How do you afford to get into farming? . . . I don't know. But we try and make sure kids have places to run around in.

BN: So what's next for you?

RB: Beats me. What I'm doing now is clearing the decks. I don't know what comes next. It seemed like a good time to pass the baton. Sonoma Land Trust is on a roll, we've got a lot of projects, we're solvent and we've got a great staff. Hell, I'm 72. It's time to try something new. I will see more of my kids and grandkids.

BN: What will you miss?

RB: I think I'll miss my colleagues on a daily basis. We have a terrific team. But it's been an office job. I think I'm going to be hiking a lot more. 🐦

(OCHOA continued from page 52) that requires funding and we're still raising money.

So far, we've cleaned both sites, laid down mulch over the areas, and at the spot on 42nd Street and Ohio Avenue we painted a mural to show the history of Richmond. We visit the sites at least twice a month to weed and beautify the place to motivate the neighbors to keep it clean.

BN: Why do you like the environmental aspect?

JOR: I worked outdoors in Mexico, so I feel kind of at home outdoors. Plus, Richmond is my community. This is where I live. This is where I want to have my kids. So if I can be part of cleaning it up, I want to.

BN: How does the work you're doing fit into the broader revitalization of Richmond?

JOR: Besides helping to clean the air, trees look beautiful and reduce crime. The kids are also a big part of it. They're learning what a tree is for and taking pride in what they've done. After they see the trees growing they want to plant more. They call the trees they planted "my tree."

BN: What do you get, personally, from being out in nature?

JOR: It's relaxing. Looking at the trees, how they move. The air. It feels like you don't have to worry about anything. It's like therapy.

JB: Do you have a favorite park to visit?

BN: I took 17 units last semester and I work, so I don't have a lot of time to get outdoors by myself. But whenever I want to take a walk, I go to Point Pinole. I really like it there.

JOB: You said you wanted to be a civil engineer. When did you decide to do that?

RN: When I was in Mexico, working for a construction company. I like that kind of hard work, although as an engineer I wouldn't be the one doing it.

My biggest goal is to have my own company. I've learned a lot about leadership and management. I don't know if I want to say I learned how to manage a person—that doesn't sound right—but I've learned the best ways to approach them. I want to focus on building homes and having a successful company that would allow me to set up a scholarship foundation to help kids in Mexico get an education. This is one of the things I get excited about. 🐦

(continued from page 6) nonprofit membership organization that raises money and advocates for parks, and played a major role in rallying public support during the 2011–2012 park closure crisis. Goldstein says upping State Parks' marketing game and business enterprise would be a good role for a new nonprofit; Conn insists that the new entity will not duplicate existing efforts.

And since we're living in the digital age, there's nothing quite as indispensable as a smartphone app to reel in visitors of all backgrounds. So the commission's blueprint has led to the development of CaliParks.org—a kind of search engine for parks with a social media overlay. On this mobile-ready site you can find a park nearby (any park, not just state parks) from any place in the state, with the kinds of activities you're interested in—camping, picnicking, or even off-roading. And, quite intentionally on the part of the designers, you can see the stream of people who have been there via Instagram and Flickr feeds.

"Many Californians don't think they will see people like themselves in parks," says Jon Christensen, a partner at Stamen Design, which spearheaded development of the site. "But if you look at social media, you will see diverse Californians in parks. In part, that's because social media skews young, diverse, and urban. But that's great for our purposes. It helps us correct the existing tendency of parks visitors and images to skew older and white." [Alison Hawkes]

What's Killing the Native Pigeon?

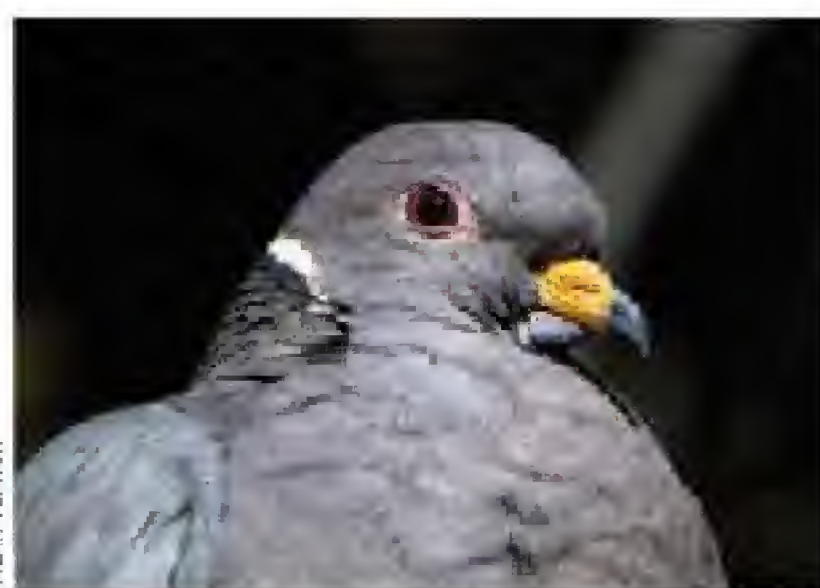
Picture a pigeon and what comes to mind? Probably not a creature that most nature-lovers would expend a lot of energy trying to save.

But what if that pigeon was a bona fide member of California's native species list? Say, the band-tailed pigeon—a sweet, sociable member of the dove family that can travel in groups of hundreds as they feast on winter acorn crops.

Unlike the familiar urban rock dove,

a European transplant that's done quite well for itself living among humans, its backwoods cousin has sustained a population drop of about 2 percent a year since 1968, when the U.S. Fish and Wildlife Service began tracking the band-tail population in its annual Breeding Bird Survey.

Though listed as a species of least concern, the band-tailed pigeon has had its fair share of obstacles to surmount—namely habitat loss and disease. *Trichomonas gallinae*, a single-celled microscopic protozoan that creates nasty "cheese-like" lesions in the beak that eventually block the bird's airway and esophagus, can kill off large numbers of birds, especially those that travel in large flocks. The disease may, in fact, have contributed to the decline of the band-tail's closest genetic relative, the passenger pigeon.



ALAN VERNON

In 2007, an outbreak killed an estimated 47,000 band-tailed pigeons in Carmel Valley. The pigeon is now beset by another outbreak, and state officials are asking for the public's help in identifying dead or dying birds and in reducing disease transmission by removing birdbaths, fountains, and other artificial water sources that are a source of disease transmission.

This year, the public is more likely to observe the band-tails at backyard feeders, as they are now showing up in suburban neighborhoods in Los Gatos and Saratoga, where they haven't been seen in more than a decade. "They're usually at a lot higher elevations, so people don't encounter them as readily as they have this winter," said Krysta Rogers, an environmental scientist at the California Department of Fish and Wildlife (CDFW). "There's a concern that people just assume they're rock doves. I'd like to

be clear that they're not."

Rogers and her colleagues at CDFW and UC Davis are applying genetic testing methods to birds collected from these large-scale mortality events and they recently found a new strain of trichomonas, indicating that the birds are being hit by multiple pathogens at once. Scientists don't know for sure what triggers an outbreak of avian trichomoniasis (the infection caused by the organism), just that it tends to cross species and be carried through water. Rock doves are suspected of being a source of contamination, but they usually don't die from the parasite.

Band-tailed pigeons, on the other hand, seem to be particularly affected by trichomonas. A bird sick with the parasite is slow to react and sometimes breathes with its bill open and swallows repeatedly. Because the pigeons have a relatively low reproductive rate of just one chick per year, an outbreak such as the current one can hit the population hard. "It can take a population years to recover," Rogers said.

Ultimately, Rogers and her colleagues want to figure out how to prevent future outbreaks to minimize mortality. To do that they need a more accurate picture of how and where the transmission is happening.

Report dead pigeons to CDFW at (916) 358-2790 or bit.ly/17ESHwy. Sick or injured pigeons can be reported to local wildlife rehabilitation facilities. A list can be found here: bit.ly/199Ewdj [Alison Hawkes]

A National Monument on the Santa Cruz Coast?

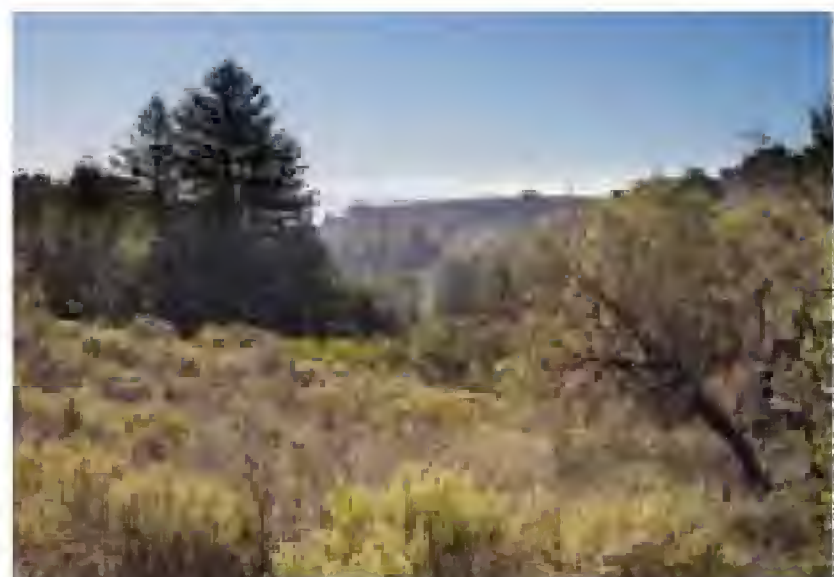
The Coast Dairies property, which spans the so-called "Slow Coast" along Highway One north of Santa Cruz, has fallen into limbo since it gained federal protection in 2006. Funding shortfalls at the U.S. Bureau of Land Management (BLM), which is in charge of the 5,848-acre property, have stalled public access to the former dairy ranch, once the third-largest privately held piece of the California coast between San Francisco and the Mexican border. (continued on page 56)

For more than a century the land has been closed to the public. But conservation groups are hoping to speed up public access and species protections on the site by asking the federal government to designate it as a national monument.

Supporters launched a campaign for what they're calling the Santa Cruz Redwoods National Monument in early February with an event in Santa Cruz that featured former Secretary of the Interior Bruce Babbitt and Congresswoman Anna Eshoo.

"Without monument status, the property may take much longer to open," says Steve Reed, campaign manager for Friends of the Santa Cruz Redwoods group. "With it, new trails, invasive species removal, interpretive signage, picnic sites, and increased ranger resources will enhance the property's natural attractiveness."

The Coast Dairies property spans



stream-carved canyons, wide-open grasslands, steep forested hillsides, maritime chaparral, and rocky seaside bluffs. In 1998 the land was on the verge of being developed into a 139-home luxury subdivision. The Trust for Public Land stepped in, however, with money raised from the Packard Foundation, the state Coastal Conservancy, and other environmental groups, to purchase and preserve the land.

TPL donated about 400 acres of beach from the property to California State Parks and passed the rest of the land to the BLM. Valued at \$40 million, it stands as the second most valuable property ever gifted to the United States government.

The BLM has plans to open large portions of the property to the public and a few months ago began giving

guided tours. However, in recent years budget shortfalls have slowed deployment of wider public access plans.

Oddly enough, the most controversial aspect of the potential monument designation, so far, has been the proposed name. "We think that the name, Santa Cruz Redwoods, is misleading and designed solely to further the effort to declare it a national monument," says Ted Benhari, chairman of the Rural Bonny Doon Association, which conditionally supports the monument designation. "The property has relatively few redwoods—only about 10 percent of its acreage. Visitors expecting that will be disappointed. Most of it is coastal chaparral." [Kaitlyn Kraybill-Voth]

A New Twist on Saving Salmon—And Keeping West Marin Affordable

The Salmon Protection and Watershed Network (SPAWN) has been working for 15 years to restore habitat for coho salmon in Marin's Lagunitas Creek watershed, which hosts the largest run of the endangered Central California coho. But it's an uphill battle to save the fish. Homes hem in the creek, preventing floodwaters from spreading out during heavy rainstorms. In some places, lawns extend right up to the creek banks, making waters too warm for the cold water-loving salmon. Runoff from lawns and failed septic systems puts additional stress on the creek and its tributaries. The extraordinary drought hasn't helped.

December's big rains provided an opportunity for fish to swim upstream but then the creeks dried up again, and overall the number of redds—basically, nests—is way down again. And looking at the bigger picture, it's not getting any easier either. With the Bay Area economy revving up, the development pressure in this bucolic part of West Marin has only intensified. Mini-mansions have replaced older, smaller homes in the San Geronimo Valley, changing this section of West Marin only 28 miles from the Golden Gate Bridge into a bedroom community for city workers. Todd Steiner, the executive director of SPAWN,

doesn't think that trend will do the salmon much good.

So SPAWN has come up with a new twist on habitat restoration of the creek: gradually buy up about a hundred homes along the main stem of the creek as they go up for sale, and then develop or lease the lots to minimize human footprint. Steiner says the land would be separated from the homes, with the homes sold as affordable



housing and the land put under a kind of conservation easement with a community land trust and restored to better habitat conditions.

"We would reforest it as much as possible—that's the ultimate goal," Steiner says. "It's an incredibly innovative idea for people to get started in home ownership and you get to live in such an amazing place." Homeowners could sell at a profit, but homes would be price-controlled to keep them affordable in perpetuity, Steiner adds.

He got the idea of separating the land from the house from the Community Land Trust Association of West Marin (CLAM), which creates affordable housing options for residents of West Marin. "It fits very well because if you buy a property but don't have total control over your land, it should be cheaper and more affordable," says Susan Scott, a CLAM board member. The idea still has a long way to go, however. At the moment, SPAWN is fundraising for a business feasibility plan to work out the details on the cost and duration of the program. Steiner figures each property would cost a half-million dollars or more to buy.

"We could be talking about tens of millions of dollars, but not all at once,"

he says. "With a few million dollars a year we could do four or five of these projects, and in 15 to 20 years we could have a significant amount."

But though fundraising is often hard, this project has the advantage of spanning many interests. After all, it's not often that environmental stewardship and affordable housing are mentioned in one breath. *[Alison Hawkes]*

Matchmaking for Sediment

Restoration managers for projects around San Francisco Bay are facing firsthand the harsh realities of climate change. How do you create tidal marsh habitat to provide space for threatened wetland species on land that is on the front lines of sea level rise?

The solution is no longer as clear-cut as breaching levees and letting these restoration sites build up by way of sediment brought by the incoming tides. With sea level along the California coast predicted to rise as much as five feet by the end of the century, there's an urgency to do more and faster.

And so restoration managers are increasingly eyeing dredge material from shipping channels, ports, marinas, and the like as valuable building material for new habitat that will make the shoreline more resilient in the face of floods, storm surges, and higher tides.

But finding dredge material when and where you need it can be a problem. It's not as if restoration ecologists and dredgers typically show up at the same cocktail parties. SediMatch, an online database that's been dubbed a "speed dating" site for the sediment community, aims to connect the two, so that agencies that are trying to get rid of their dredge spoils can pair up with agencies that need them.

SediMatch will be launched online later this year as a collaborative effort of the San Francisco Bay Joint Venture (SFBJV), the Bay Conservation and Development Commission, the San Francisco Estuary Institute, and the San Francisco Estuary Partnership.

"It's not realistic to do a restoration project and just open it up and wait for

the tides to bring in sediment. It's not feasible to keep up with sea level rise in that scenario," says SFBJV's Sandra Scoggin, who's in charge of developing the database. "Yet we need to increase the pace and scale of restoration."

Even prior to the launch of the SediMatch service Craig Garner, restoration manager of the Cullinan Ranch project in the San Pablo Bay National Wildlife Refuge, had already made use of it. The project will restore more than 1,500 acres of tidal wetlands, of which 300 require imported sediment to elevate land that has subsided by six feet. So Garner's team went looking for dredgers to bring in that sediment. "Our engineers have been going to SediMatch meetings for several years," says Garner. "I think it benefited us by making those contacts."

SediMatch may solve only one of the challenges facing restoration managers. But with sediment from the bottom of the Bay suddenly a sexy commodity, surely if there's a will, there's a way. *[Alison Hawkes]*

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Components of the Worst-Case Scenario

Scenario: an earthquake triggers liquefaction, followed by derailed oil tankers, breached gas transmission lines, and broken water mains.

Shale oil from the Bakken formation in North Dakota, Montana, and Canada contains high levels of propane and ethanol. Phillips wants to railhaul it through the Bay Area to a proposed facility in San Luis Obispo. From there it will be exported. The Sierra Club thinks the blast zone is a half-mile wide. The Club is fighting the facility.

Write to County Supervisors at <http://www.slocounty.ca.gov/bos/BOSContactUs.htm>. Send tax-deductible contributions to stop the facility: The Sierra Club Foundation, 85 2nd St. Ste 750, San Francisco, CA 94105, with ELP-CBR on the memo line.



On March 5, 2015, this oil train with "safer" cars derailed in rural Illinois. Photo from KCRG-TV website, credited to @scandbq.



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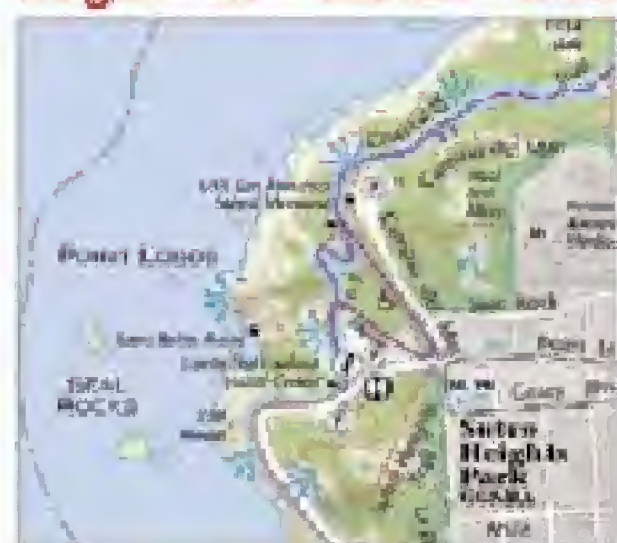
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ask the naturalist

M I C H A E L E L L I S

Q: We have several species in the Bay Area that fluoresce under UV light. How does this benefit scorpions, for example? Thank you!

—Katherine, Mountain View

A: It's still an open question as to how, or even whether, fluorescence benefits scorpions. There is a range of potential explanations: it does nothing at all; it helps them mate, or lure prey, or identify other scorpions, or see better, or block harmful UV radiation, like scorpion sunscreen. Recently, scientists have suggested that scorpions, which flee light, might use fluorescence to better detect UV light.

While it's still a mystery, to me the scorpions illustrate how narrow a part of the electromagnetic spectrum humans dwell in. Whatever they're using fluorescence for (or whether they're using it all), scorpions are doing something that we can't notice unless we enlist special equipment that allows us to expand our limited capability and see a different world. Prospectors searching for uranium ore after World War II used ultraviolet because the probable deposits glowed—and, coincidentally, so did those long-tailed arachnids. During trips to the desert I used to bring a UV light to shine around our camping sites to show how many scorpions were there. But this just made everyone nervous so I stopped doing it.

The electromagnetic spectrum includes X-rays, gamma rays, radiant heat, radio and television waves, microwaves, and cell phone transmissions, all of which are continually passing around and through us without our being aware of it. That is, unless you have one of those special dental fillings that receives communications from aliens—just kidding.

The human eye can only see a tiny, tiny part of the immense range of this energy. The rods and cones in our cornea create our visual “reality” by chemically reacting to visible light photons hitting them; that information

is transmitted through the optic nerve to the brain. There, a 3-D image is created that does not exist out there in the “real” world.

Many other creatures can “see” wider parts of this spectrum. Shine a black light on a wild radish flower and bold streaks appear on the petals. These lines direct the pollinating insect, just like landing lights on a runway, straight to the nectaries—the sugar reward. Most insects are sensitive to this part of the spectrum above the purple of the rainbow, the region called ultraviolet.

Rattlesnakes, on the other hand, can see, if you can call it that, below the limit of red that humans perceive and into what is therefore called the infrared (“below red”). The snakes have sensory pits right below their eyes that can detect heat radiating from their mammalian prey, like



MARLIN HARMS

Arnold Schwarzenegger's character in the movie *The Terminator*.

Urine glows in the UV part of the spectrum and hovering American kestrels are able to locate their rodent prey by seeing its urine-stained trails in the field below.

I revel in the truth that the nature of reality is so much greater than my feeble human senses can ever begin to perceive, and Katherine, I always appreciate the glow of a scorpion under black light—even if it has no meaning (that we've discovered) other than alerting trepidatious desert campers. 🦂

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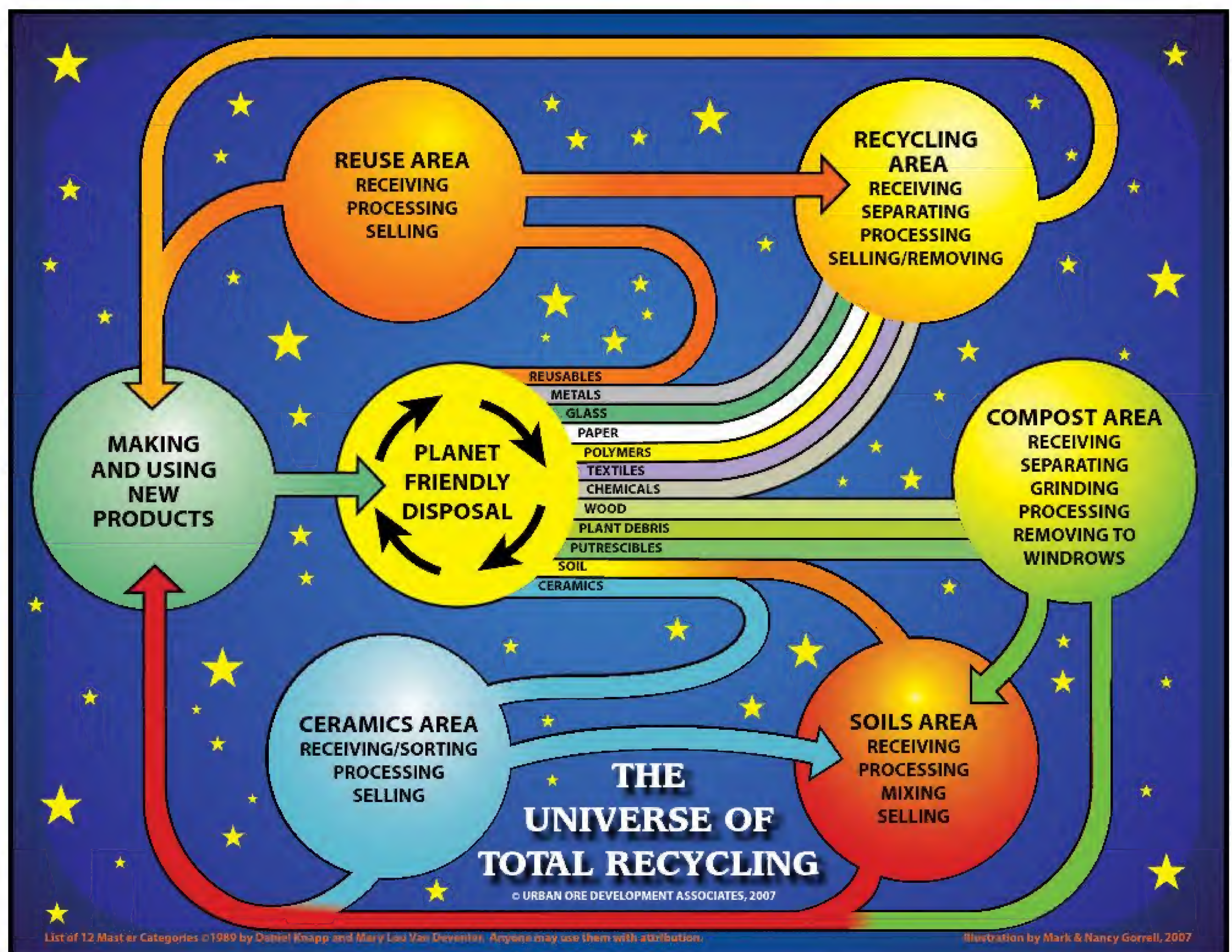
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